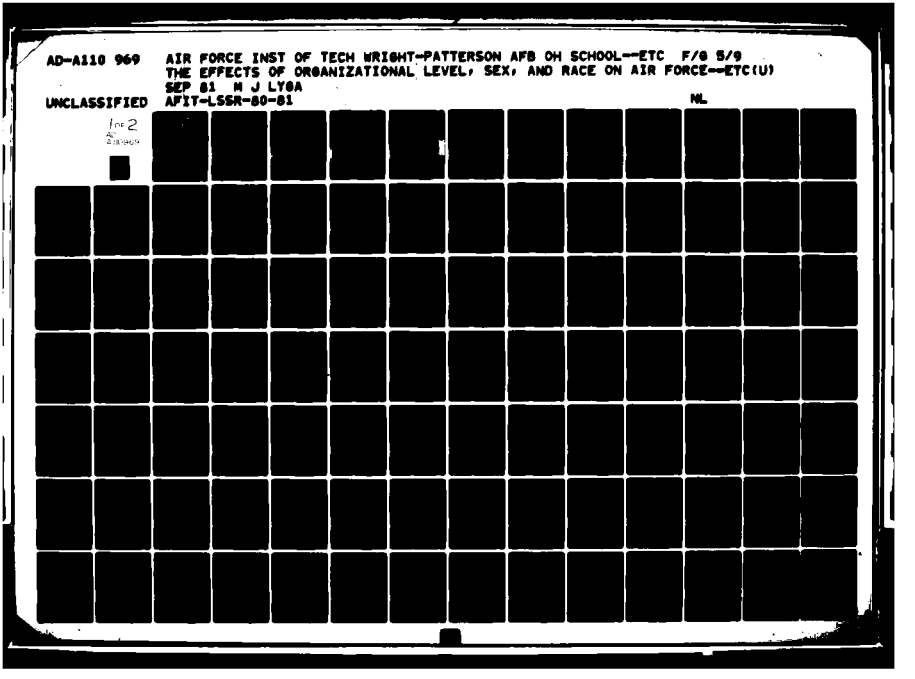
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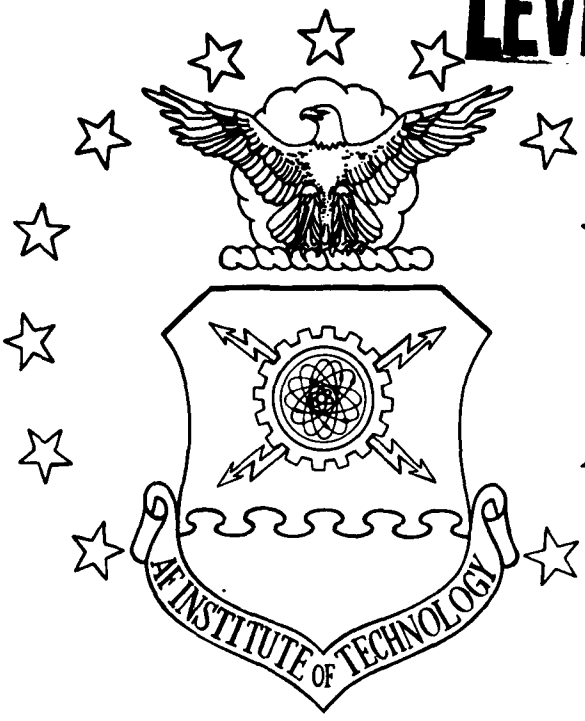

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AIR FORCE INSTITUTE OF TECHNOLOGY

Wright-Patterson Air Force Base, Ohio

THE EFFECTS OF ORGANIZATIONAL LEVEL, SEX, AND RACE ON AIR FORCE ORGANIZATIONAL EFFECTIVENESS

Michael J. Lyga, Captain, USAF

LSSR 80-81

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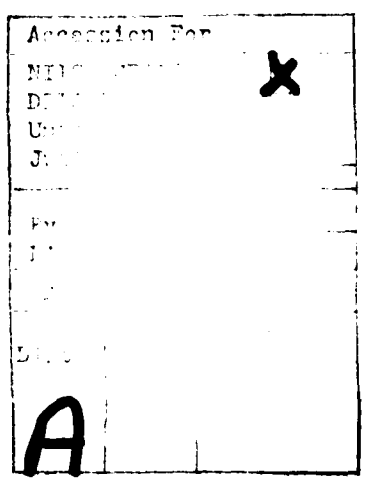

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The purpose of this study was to determine if the situational variables: organizational level, sex, and race have measurable effects on Air Force supervisors' perceptions of organizational effectiveness as measured by three criteria--job satisfaction, perceived productivity, and organizational climate. Using data provided by the Leadership Management and Development Center, the research sample consisted of Air Force supervisors of both sexes, who were either black or white. Three-way analyses of variance were performed, one for each effectiveness criterion, to test the hypotheses of "no main effects" and "no interaction effects." The results indicated that organizational level, sex, and race, individually, do have significant effects on perceptions of organizational effectiveness. Due to the limitation imposed by small minority frequency distributions, determination of the significance of interaction effects was considered inconclusive, and opinion must be reserved until a more robust and representative sample has been examined.

LSSR 80-81

THE EFFECTS OF ORGANIZATIONAL LEVEL, SEX, AND RACE ON AIR FORCE ORGANIZATIONAL EFFECTIVENESS

A Thesis

Presented to the Faculty of the School of Systems and Logistics

of the Air Force Institute of Technology

Air University

In Partial Fulfillment of the Requirements for the

Degree of Master of Science in Systems Management

By

Michael J. Lyga, BS
Captain, USAF

September 1981

This thesis, written by

Captain Michael J. Lyga

has been accepted by the undersigned on behalf of the faculty of the School of Systems and Logistics in partial fulfillment of the requirement for the degree of

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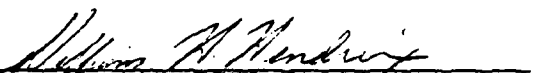

COMMITTEE CHAIRMAN

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CHAPTER 1

INTRODUCTION

Organizational Effectiveness

Since the beginning of the industrial revolution, organizational researchers have been concerned with the concept of organizational effectiveness. The diversity between and within organizations has led researchers to explore the concept from a variety of perspectives, using different models and criteria. However, on one issue there is virtually total agreement--organizational effectiveness is one of the most important and pervasive concepts in organizational theory. For example:

> Effectiveness is seen as the ultimate goal of most organizations... [Steers, 1977, p. 2].

> ...it is difficult to conceive of a theory of organizations that does not include the construct of effectiveness... [Goodman and Pennings, 1977, p. 2].

> Organizational effectiveness has been, and continues to be, of prime interest in all types of organizations [Hendrix and Halverson, 1979a, p. 7].

Regardless of one's approach, it is against the concept of organizational effectiveness that managerial and organizational success are ultimately judged.

Air Force Organizational Effectiveness

In today's Air Force, improving organizational effectiveness is a major managerial concern. The bureaucratic structure of military organizations has made them ideally suited to function effectively in a relatively stable and predictable environment. However, Air Force leaders have recognized that the system of formal controls, specialized roles and tasks, and standarized decision rules which characterize the bureaucratic structure have been challenged by today's dynamic and unpredictable environment. Many forces, in both the external and internal environments, are accelerating the need for change in Air Force management strategies. Technology is becoming more sophisticated and complex; competition for scarce and valued resources is increasing; and human values are changing with respect to the work environment and the role of the military in society (Hester, 1980, p. 1). Thus, the need for Air Force managers to understand the nature and process of organizational effectiveness is of paramount importance. It was to this end that the Leadership and Management Development Center (LMDC) was created in 1975.

LMDC

LMDC was created at Maxwell AFB, Alabama with the task of establishing a comprehensive organization development program focusing on leadership effectiveness for the United States Air Force. The LMDC mission includes:

(1) providing instruction and consultation services in the field of leadership, management and job environment, and

(2) providing better leadership and management education for Air Force personnel on a worldwide basis [LMDC, 1979, p. ii].

LMDC organizational effectiveness research involves collecting organizational data, evaluating it for organizational strengths and weaknesses, attempting to identify variables which differentiate successful organizations from less successful ones, and focusing management attention on the identified problem areas. The foundation of this research is the data base accumulated through the Organizational Assessment Package (OAP).

OAP

The primary method of data collection by LMDC is through a fixed-response questionnaire called the OAP. The OAP survey instrument was developed jointly by the Air Force Human Resources Laboratory, Brooks AFB, Texas, and LMDC specifically to meet the mission objectives of LMDC. The goals of the OAP in support of the LMDC mission are:

> First, the OAP provides a means of identifying existing strengths and weaknesses within organizational work groups, such as directorates. Second, research results can be fed back into their Professional Military Education; other leadership and management training courses; and when action is required, to Air Staff and functional offices of primary responsibility. Lastly, the OAP data base established can be used for research to strengthen the overall Air Force organizational effectiveness program [Hendrix and Halverson, 1979a, p. 5].

Additionally, the OAP was designed to measure the basic

components of the Three Component Organizational Effectiveness Model, a model which is frequently used in Air Force organizational effectiveness research.

Three Component Organizational Effectiveness Model

The Three Component Organizational Effectiveness Model, hereinafter referred to as the Three Component Model, hypothesizes that effectiveness is a function of the managerial style employed, the criteria selected, and the situational environment (see Figure 1-1).

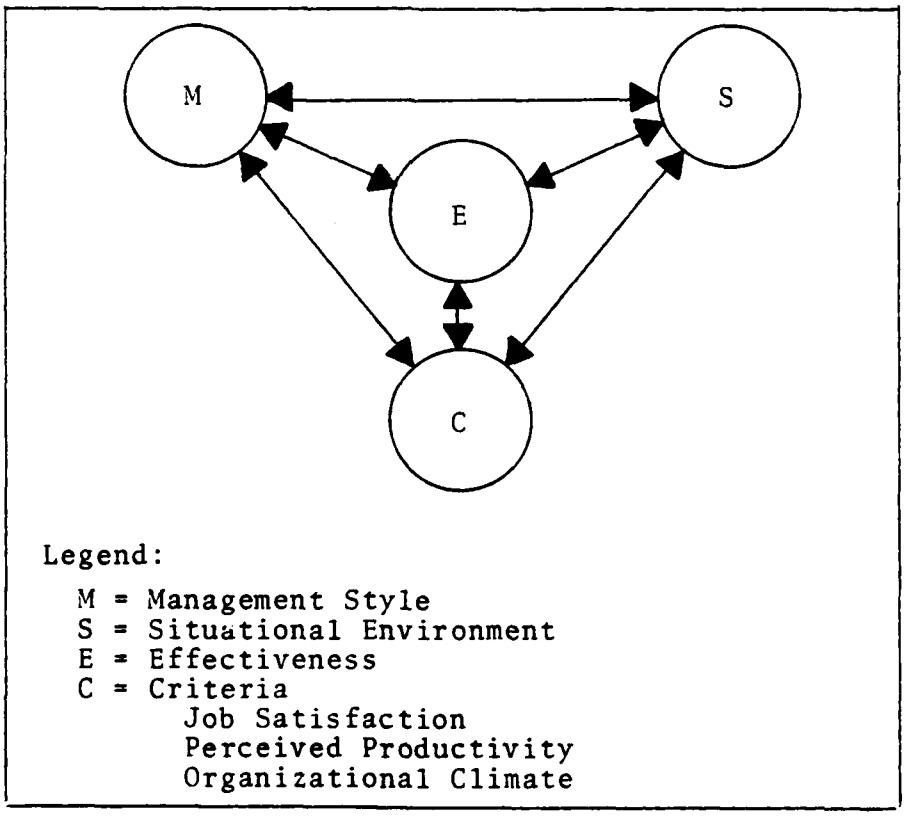

Figure 1-1
Three Component Organizational Effectiveness Model (adapted from Hendrix and Halverson, 1979a)

This contingency model reflects the multivariate nature of organizations and attempts to tailor the measure of effectiveness to a given organization's particular situation. While the conceptualized three-way interaction of components in the Three Component Model has not yet been validated, research has shown that different situational variables do affect organizational effectiveness (Hendrix and Halverson, 1979a; Hester, 1980).

Organizational Level, Sex, and Race

When viewing Air Force managers as a microcosm of American society, one set of situational variables that has not been fully explored, yet has tremendous potential to affect organizational effectiveness, is: organizational level, sex, and race. The Air Force has traditionally been a predominantly white, male service. Organizationally, it has been characterized by a rigid, hierarchical structure (chain-of-command), where each successively higher level has more power, responsibility, and prestige than the preceding level. On the other hand, as a result of the race relations revolution (beginning in the 1960's) and the women's "movement" (beginning in the early 1970's), both black and women minorities[1] are in the process of change with respect to their

[1]Although women represent a statistical majority in the national population, legally, occupationally, and in other ways they have shared many of the problems of minorities, and are, in fact, a statistical minority within the Air Force. Hence, the term "minority," when used in this report, will include women.

perceptions, expectations, aspirations, and values (Campbell, Converse, and Rodgers, 1976, p. 373). Additionally, the number of blacks and women in the Air Force has steadily increased over the past few years (Gates, 1980; U.S. Bureau of Census, 1980). Within this context, of the many dimensions along which Air Force managers might be divided in terms of their perceptions (i.e., job satisfaction, perceived productivity, and organizational climate), three that appear to have compelling implications are: organizational level, sex, and race.

Purpose

The purpose of this research was to determine if the situational variables (organizational level, sex, and race), either individually or interactively, have a significant effect on organizational effectiveness criteria (job satisfaction, perceived productivity, and organizational climate). The question the research attempted to answer was:

> Do supervisors of different sex and race groups differ on the three criteria of organizational effectiveness at different organizational levels?

The answer to this question should indicate the utility of these three situational variables as predictors of organizational effectiveness. Additionally, the results should add to the data base accumulated from research of the Three Component Model and serve as a basis for further exploration into the dynamics of Air Force organizations.

Scope

While the Three Component Model conceptualizes the interaction between three components, the scope of this study was limited to exploring the effects of situational environment variables on three criteria. For the purposes of this study, the original OAP data base (Version 3, N = 4786) will be restricted to a subsample including only Air Force military managers/supervisors[2] of either sex, who are either black (not Hispanic origin) or white (not Hispanic origin).

Assumptions

It is assumed that the Three Component Model, as diagrammed in Figure 1-1, accurately reflects the components, relationships, and interactions of an actual organization. Additionally, the criteria (job satisfaction, perceived productivity, and organizational climate) are assumed to be valid indicators of organizational effectiveness. The OAP (Verson 3) data base (N = 4786) is assumed to be a representative cross-section of the overall Air Force population.

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[2]The terms manager and supervisor may be used interchangeably throughout this study. While the technical distinction of organizational level is recognized (see Albanese, 1978, p. 10), within the Air Force the term supervisor is used to describe a person who has one or more subordinates working for him, regardless of whether the subordinate is a manager, and regardless of the organizational level.

Approach and Presentation

In order to answer the research question posed earlier in this chapter, the remainder of the study will address the following areas. Chapter 2 provides a selective literature review to put the research effort into perspective. It begins with a general review of organizational effectiveness research to establish the state-of-the-art, to identify some problems, and to highlight the potential benefits of the contingency approach to organizational effectiveness. This general review is followed by a more detailed examination of the Three Component Model, a contingency model, and stresses the importance of the situational environment. The final section explores major components of the situational environment (i.e., organizational and individual characteristics), examines their interaction, and provides an overview of some related research findings. Chapter 3 covers the methodology of the research. The methods used to collect the research data, to modify the research sample, and to identify and measure the research variables are followed by an explanation of the statistical procedures employed and an overview of the general research approach. Next, Chapter 4 presents the results of the research sample modifications and the analyses. Chapter 5 gives the researcher's conclusion and recommendations.

CHAPTER 2

LITERATURE REVIEW

Introduction

This chapter provides a literature review, progressing logically from the general topic of organizational effectiveness to the specific issue of the research question (i.e., effects of organizational level, sex, and race on organizational effectiveness). Therefore, the first section of the chapter begins with a general review of organizational effectiveness: the different definitions, the different models, and the various problems. The first section concludes with a review proffering the contingency approach of organizational effectiveness research as a means of dealing with the diversity among and within organizations.

Following on that theme, the second section of the chapter examines the contingency model frequently used by the Air Force in its organizational effectiveness research--the Three Component Model. This section provides a review of the model's development and the associated research, with a view towards highlighting the importance of the situational environment component.

The final section takes a detailed look at the situational environment and its potential effect on organizational

effectiveness. Specifically, this section analyzes three sets of situational variables with emphasis on two that have direct bearing on this study--organizational characteristics (i.e., organizational level) and individual characteristics (i.e., sex and race). In essence, this section provides the basis for the research project by hypothesizing where interactions among variables exist, which, in turn, may affect organizational effectiveness; examining the nature of the Air Force with respect to organizational level, sex, and race; and reviewing relevant research findings with respect to these variables and organizational effectiveness.

Organizational Effectiveness

To put this research effort into perspective, it is first necessary to establish "What is organizational effectiveness?" A review of the literature shows that although organizational researchers have been studying the construct of organizational effectiveness for over 50 years, much disagreement still persists regarding how it is defined, how it is conceptualized, and how it is measured (Steers, 1977, p. 1, 50-51; Cameron, 1978). In fact, despite general agreement on the overall importance of the concept of effectiveness in organizational theory,[3] there is little consensus on anything else.

---

[3] e.g., "...it is difficult to conceive of theory of organizations that does not include the construct of effectiveness... [Goodman and Pennings, 1977, p. 2]."

What Is Organizational Effectiveness?

To answer the question, "What is organizational effectiveness?" some representative definitions are presented in the text that follows. For Argyris organizational effectiveness represents a condition where the organization increases outputs with constant or decreasing inputs or has constant output with decreasing inputs (Argyris, 1964, p. 123). Katz and Kahn (1978), in their influential book, The Social Psychology of Organizations, define effectiveness in terms of

> maximization of return to the organization by all means. Such maximization by economic means has to do with efficiency; maximization by noneconomic or political means increases without adding to efficiency [p. 225].

Seashore and Yuchtman (1967) define an organization's effectiveness in terms of its bargaining position--that is, how well it can exploit its environment in the acquisition of scarce and valued resources (pp. 377-395). Mohr (1973) views effectiveness as "a measure of how well or to what extent something is accomplished." Obviously, the question of what defines organizational effectiveness is problematic; however, most definitions of organizational effectiveness reflect one of two distinct emphases: survival or goal attainment. From the survival perspective, the organization is effective if it manages to maintain an inflow of essential resources from its environment. From this perspective

the effectiveness problem concerns relations with the environment and particularly managing the environment. The more classical usage refers to goal attainment; an organization is effective if it meets or surpasses its goals. Even when narrowed by these two perspectives, the definitions are stated in such an abstract and general level that they provide little understanding of the meaning of effectiveness and little guidance in the eventual operationalization of the concept (Lawler, Nader, and Cammann, 1980, p. 192).

Organizational Effectiveness Models

Most organizational effectiveness models[4] have focused primarily on organization-wide phenomena, resulting in little consideration being accorded to the role played by the various subunits. Additionally, these macro models have tended to take one of two forms in specifying their criteria indicators of effectiveness: univariate or multivariate (Steers, 1977, p. 39).

Univariate Models. Univariate (global criterion) models examine one specific effectiveness criterion to measure overall organizational effectiveness. A review by Campbell, Bownas, Peterson, and Dunnette (1974) of univariate measures employed to measure organizational success resulted in the

---

[4]Steers (1977, Chapter 3) provides an excellent analysis of the different classifications/categories of organizational effectiveness studies. My section on models follows his Chapter 3 development.

identification of nineteen variables that were widely used (see Appendix A). The most prominent of these were: (1) overall performance, (2) productivity, (3) employee satisfaction, and (4) employee withdrawal. It is difficult to conceive of some of these variables by themselves as comprehensive or even adequate measures of organizational effectiveness.

Multivariate Models. Multivariate models generally represent more comprehensive attempts to study major sets of variables involved in the effectiveness construct and to suggest how such variables fit together. A representative sample of 17 of these models is summarized in Appendix A. An examination of these models reveals a wide range of opinions concerning how best to evaluate organizational effectiveness. Steers (1977, pp. 43-50) compared these various approaches along four dimensions to further emphasize their diversity. First, not only is there a lack of consensus as to what constitutes a useful set of measures, but differences can be found in the way such criteria are believed to be related (i.e., static or dynamic). Second, it is possible to differentiate the models as either: (1) normative, which tend to prescribe desirable behavior (e.g., Price, 1968; Likert, 1967); or (2) descriptive, which attempt to summarize the characteristics which have been found in successful organizations (e.g., Mahoney and Weitzel, 1969). Third, various models differ with regard to their purported universality or validity in other organizational settings. Finally, while several sets of

criteria were obtained in a deductive fashion, others used a variety of quantitative and non-quantitative methods to "calculate" measures in an inductive fashion.

Problems in Measuring Organizational Effectiveness

In addition to the "confusion" associated with the inconsistency in approaches to organizational effectiveness in terms of definition, nature of the model, and criteria, there are some problems in measuring organizational effectiveness that are inherent to any model-building effort (Table 2-1).

TABLE 2-1

Problems in Measuring Organizational Effectiveness

Criterion Stability	Generalizability
Time Perspective	Levels of Analysis
Multiple Criteria	Measurement Precision

Adapted from Steers, 1977

The problem with criterion stability, for example, is that the criterion used to measure effectiveness at one point in time may be inappropriate or misleading at a later time due to changes in the environment. The time perspective problem concerns the issue of different criteria being inappropriate for short, intermediate, and long-term perspectives. Multiple criteria, while generally presenting a more comprehensive look at an organization, can also present a problem when the measures of effectiveness conflict with one another

(e.g., employee satisfaction and productivity). This possible conflict would require the manager to make a value judgment on which criteria is more important based on the situation. Generalizability has already been discussed; simply, how widely can one generalize the evaluation criteria of one organization to other organizations, or to different levels of the same organization. Levels of analysis deals with the issue of "at what organizational level is effectiveness measured--individual, work group, division or organization?" Finally, measurement precision concerns itself with a variety of problems inherent in the process of assigning a numeric value to attitudes and perceptions, and aggregating the values at various levels.

Summary

The purpose of this section[5] was to highlight the complex nature of organizational effectiveness by analyzing the various ways in which effectiveness has been operationalized in various studies. It should be apparent that there is no one "correct" definition of effectiveness; definitions will be a function of one's theoretical perspective of organizations. Likewise, there is no one "best" criterion (or set of criteria) for measuring effectiveness; criteria will depend on who is doing the measuring and their particular

---

[5]For a more detailed and in-depth review of organizational effectiveness literature, see Campbell et al., 1974; Lawler et al., 1980; Steers, 1977. All are excellent reviews of the concept of organizational effectiveness.

values and preferences (Lawler et al., 1980, p. 195). One should not conclude from these apparent inconsistencies that meaningful research on organizational effectiveness cannot be accomplished. Although some have argued that position (Hannan and Freeman, 1977), the concept is too pervasive to be dismissed. What is needed is an approach that will account for the heterogeneity among organizations.

Organizations differ not only in size and shape (i.e., structure), but also in the technologies they employ, environments in which they function, the work climates they create, and the types of goals they pursue. Steers (1977) suggests that a more productive approach to the study of organizational effectiveness may be through the willingness to accept such diversity among organizations and to attempt to deal with it through a contingency approach to organizational effectiveness. This contingency, or tailored, approach to the study of organizational effectiveness will greatly facilitate the precision of understanding of a given organization's particular characteristics that contribute to ultimate performance and organizational success (pp. 15-16).

The Three Component Model

The Three Component Model is a contingency approach to organizational effectiveness. Accordingly, this section will provide a brief overview of the contingency approach, an analysis of the major components of the Three Component Model from a developmental perspective, and a review of situational

variable research employing this model.

A Contingency Approach

In recent years the word "contingency" has invaded the field of organizational theory. It began by describing a specific "contingency theory of leadership" and a "contingency theory of organization." By the 1970's, the general utility of the term became widely apparent and now there are contingency theories or views for virtually every aspect of management (Albanese, 1978, p. 25). However, there is good reason for the widespread interest in the contingency approach.

The appeal of the contingency approach derives from three sources. First, the contingency view recognizes that every organization represents a unique situation of various interactions, interdependencies, and influences. In other words, it recognizes the diversity among organizations. It presents the view that there is no one best way to manage an organization in all situations that will consistently result in effective performance. Second, the contingency approach focuses on identifying and analyzing critical situational factors that cause some organizations to function more effectively than others. Finally, the contingency approach highlights the importance to managers of developing skills in situational analysis if they are to effectively cope with changing environments. Put in the context of organizational effectiveness, the contingency approach would state in general terms that effectiveness is contingent upon the situation (environment,

nature of work, climate, etc.) of the particular organization. Kast and Rosenzweig provided an excellent summary of the contingency approach:

> The contingency view seeks to understand the interrelationships within and among subsystems as well as between the organization and its environment and to define patterns of relationships or configurations of variables. It emphasizes the multivariate nature of organizations and attempts to understand how organizations operate under varying conditions and in specific circumstances. Contingency views are ultimately directed towards suggesting organizational designs and managerial actions most appropriate for specific situations [1978, p. 115].

Model Development

One of the major areas where the contingency approach has been used extensively is in the investigations of leadership style, environmental (situational) variables, and effectiveness (Hester, 1980, p. 35). In fact, the Three Component Model was originally developed as a synthesis of eight different leadership effectiveness models and was named the Three Component Leadership Effectiveness Model (Hendrix, 1976). It was later expanded to a more comprehensive model of organizational effectiveness and the leadership style component was replaced with the managerial style component. The model was otherwise unchanged, focusing primarily on organizational effectiveness as a function of three interdependent components: managerial style, situational environment, and criteria (see Figure 1-1). The selection of these particular three components was based on their predominance across the leadership literature reviewed (e.g., Cribbin, 1972; Fiedler, 1967;

Hersey and Blanchard, 1972; Katz and Kahn, 1966; Olmstead, 1967; Reddin, 1967, 1970; Stogdill, 1958, 1959, 1971; Tannenbaum et al., 1961) and their usefulness for depicting leadership as a decision-making process (Hendrix, 1976).

Management Style Component. In selecting the dimensions of management style component, Hendrix (1976) considered a myriad of situational leadership theories with their associated leadership dimensions and relationships to the situation and criterion. The review ranged from the classic two-dimensional models of the Ohio State (initiating structure and consideration) and the Michigan (job-centered and employee-centered) studies, to the expanded four-dimensional models of Bowers and Seashore (1966) and Reddin (1967), to the five-dimensional model derived by Wofford (1970, 1971). However, Wofford was probably the most influential due to his emphasis on the managerial aspects of a leadership style. Hendrix states in his development of the management style component that his dimensions were derived from studies involving the managerial functions as well as the leadership functions (Hendrix, 1976, p. 31). Hendrix's five dimensions are defined as follows:

> The "group processing" factor or dimension refers to the predominant managerial style employed by a manager who uses the group process in decision making, organizing, motivating, and communicating. He is thorough, plans well, and is highly organized and orderly. This factor is characteristic of the professional administrator.
>
> The "self-enhancing" factor refers to the leader who uses his organizational authority as the primary means of influencing subordinates. He is outspoken

and demanding and seeks personal recognition rather than recognition for his subordinates.

The "dynamic interacting" factor refers to the leader who is warm, friendly, and informal in his interactions with his subordinates. He spends a great deal of time interacting with his subordinates and often works with them to complete their daily assignments.

The "structural achieving" factor refers to the leader who sets specific goals with his personnel and measures their performance in reaching these goals. He is open and direct with others, and is characterized as efficient and energetic.

The "compromising" factor refers to the leader who is cautious, somewhat aloof, and who checks with both his supervisor and his personnel before making a decision. He prefers to remain neutral when problems arise, and he readily changes his decisions when there is disagreement with them. Since he separates himself from his personnel, he promotes a great deal of freedom for their actions; such as setting their own goals, establishing their work routines, and developing their work standards.

Criteria Component. In developing the multivariate criteria component, Hendrix (1976) was primarily influenced by the earlier research of Carter and Nixon (1949) and Wofford (1971). Carter and Nixon, for example, used four different criteria to measure leadership effectiveness, and then compared these different criteria against actual task accomplishment. From the generally low correlation between the criteria (range: -.25 to .66), the researchers concluded that leadership effectiveness is contingent, at least partially, on the criteria used. Similarly, Wofford (1971) performed a study using two criteria (productivity and morale) to measure managerial behavior (five managerial dimensions). Wofford concluded that "the managerial behavior dimensions

most effective for productivity are not the most effective for morale [p. 16]." Taken together, these two studies indicate that for a fixed managerial/leadership style, effectiveness depends upon the criteria used. A corollary inference is that a particular style may be more effective depending on the criteria selected. Therefore, Hendrix's (1976) inclusion of multiple criteria for effectiveness in the framework of his model (Figure 1-1) would imply that in a given situation, as different criteria are established, a manager may be required to vary his or her style to be effective.

After reviewing the literature on past studies of effectiveness (Appendix A, for example), Hendrix and Halverson (1979a) selected job satisfaction, perceived productivity, and organizational climate as the three criteria for the Three Component Model. These criteria focus on both the "people" and "task" aspects of organizational effectiveness and are three of the most commonly used measures in effectiveness studies (Appendix A). Additionally, they can be readily measured by means of the OAP.

Situational Environment Component. The third component of the Three Component Model is the situational environment component. The situational environment, like human behavior, may be characterized by an overwhelming number of variables. It is necessary, therefore, to select and classify the most salient variables into categories or factors which will be representative dimensions of the situational environment. For example, from the contingency models that Hendrix (1976)

reviewed, Cribbin (1972) identified some of the most important situational variables that influence leadership as (1) the culture, (2) the political structure, (3) the society involved, (4) the philosophy of the organization, (5) the technology involved, and (6) the organizational structure. Additionally, Wofford (1971) extracted five orthogonal factors from a list of 18 situational variables selected from an earlier literature review (Wofford, 1967). The five factors extracted were: (1) centralization and work evaluation, (2) organizational complexity, (3) size and structure, (4) work group structure, and (5) organizational layering and communication; and these are very similar to the five factors cited in a previous review by Forehand and Gilmer (1964). Other important situational variables that were identified in various studies that have direct bearing on this research effort are: organizational level of the leader (Katz and Kahn, 1978) and the subordinates in the organization (Vroom, 1960).

Hendrix (1976), based primarily on the studies of Forehand and Gilmer (1964), Wofford (1971), and Hersey and Blanchard (1972), proposed six situational environment variables: (1) centralization and work evaluation, (2) organizational complexity, (3) size and structure, (4) work group structure, (5) organizational communication, and (6) group member maturity.

> The "centralization and work evaluation" factor refers to the degree of centralization of the decision-making power in the organization, and to the situational aspects influencing the closeness of supervisory control.

The "organizational complexity" factor refers to the degree of organizational complexity and sophistication. The level of ability and technical knowledge required are aspects of this factor.

The "size and structure" factor refers to the size of the organization and the degree of work task structuring.

The "work group structure" factor refers to the work group's structural attributes. For example, a high rating on this factor would indicate that a work group was small and its operations supported group meetings.

The "organizational communication" factor refers to those aspects of the organization relating to communication layers and peer communications.

The "group member maturity" factor refers to the capacity of group members to take responsibility, be able to set their own goals, and work without close supervision.

Situational Environment Studies

Although the conceptualized three-way interaction between the three major components of the Three Component Model has not yet been validated, several studies have shown the effect of various situational variables on the criteria of effectiveness. Hendrix and Halverson (1980) ran 22 different one-way and two-way analyses of variance (ANOVA) to determine the influence of personnel and background differences (i.e., situational variables) on the criteria of effectiveness. Summaries of the significant main effects for all one-way and two-way ANOVAs are in Tables 2-2 and 2-3 respectively. Additionally, Hester concluded that although his research did not produce evidence to support the interaction effects of management style and situational environment

TABLE 2-2

Summary of One-Way Analyses of Variance

		Criteria			
Description	Analysis	General Organizational Climate	Organizational Communications Climate	Job Related Satisfaction	Perceived Productivity
Months in Organization	1	***	**	***	***
Months Experience in Job	2	***	***	***	**
Educational Level	3	***	***	***	***
People Supervised	4	***		**	***
Supervisor Writes Performance Report	5	***	***	***	***
Work Group Size Group	6	***		***	***
Work Hour Stability	7	***	**	***	***
Group Meetings Used	8	***	***	***	***
Work Schedule	9	***	**	***	***
Career Intentions	10	***	**	***	***
Major Command (MAJCOM)	11	***	***	***	***
Oganizational Level	12	***	***	***	***
Work Group Codes	13	***	***	***	***
Educational Level—Officers	14	***	***	***	***
PME—Officers	15	***	**	***	***
Educational Level—Airmen	16	***		**	
PME—Airmen	17	***		***	***
Educational Level—Civilians	18	**	***		**

*p < .05; ** p < .01; ***p < .001

TABLE 2-3

Summary of Two-Way Analyses of Variance

		Criteria			
Analysis	Factors	General Organizational Climate	Organizational Communications Climate	Job Related Satisfaction	Perceived Productivity
19	1 Classification	***		***	***
	2 Grade	***	*	***	***
20	1 Classification	***		***	*
	5 Race	***		*	***
21	1 Classification	***		**	
	6 Sex				**
22	6 Sex			***	*
	13 Communication	***		**	***

*p < .05; **p < .01; ***p < .001

on organizational effectiveness, different situational profiles were found to exert influence on the criteria of effectiveness. For all criteria, for example, greater effectiveness was found to occur in the situational environment labeled "inspect and repair" (pp. 91-92).

Summary

The common theme throughout this section has been the overwhelming importance of "the situation" in the Three Component Model. The "situation" is the dominant factor from which the contingency approach has evolved. Additionally, development of the Three Component Model was a sythesis of major "situation" models of leadership effectiveness. Finally, the limited amount of research accomplished on this relatively new Three Component Model has confirmed the prevailing influence of the situational component on effectiveness criteria.

Situational Environment

This section examines the situational environment and its potential effect on organizational effectiveness. It begins by analyzing sets of situational variables with emphasis on two that have a direct bearing on this research--organizational characteristics (i.e., organizational level) and individual characteristics (i.e., sex and race). Next, potential conflicts/problems caused by interaction of these two situational variables are discussed. Then the nature of the Air Force is examined in the context of organizational level, sex, and race. Finally, the section concludes with a

review of research findings relevant to the three situational variables and organizational effectiveness.

Dimensions of Situational Effectiveness

Consolidating specific variables or dimensions of the situational environment at the broadest level of analysis, there are three major sets of situational variables that potentially have an influence on organizational effectiveness. As indicated in Figure 2-1,[6] these three situational domains are: (1) external environment, (2) organizational characteristics, and (3) individual characteristics. The external environment refers to those forces that arise outside an organization's boundaries that affect internal organizational decisions and actions. For example, the political, regulatory, resource, technological, and economic characteristics of a society are external environment variables. The second major set of situational variables is organizational characteristics. These incorporate such variables as organizational structure, internal technology,and managerial policies. The final set of situational variables is individual characteristics. These

[6]This model attempts to depict the relationship between major sets of situational variables and individual performance/behavior. It expands Lawler's "job characteristics, etc." to "Organizational Characteristics" (Lawler et al., 1980, p. 107). This model attempts to integrate the micro and macro levels of analysis by depicting how situational variables interact to influence individual behavior which, in turn, contributes to or detracts from organizational effectiveness. This approach is based on the premise that the behavior of organizational members is the ultimate determinant of organizational effectiveness.

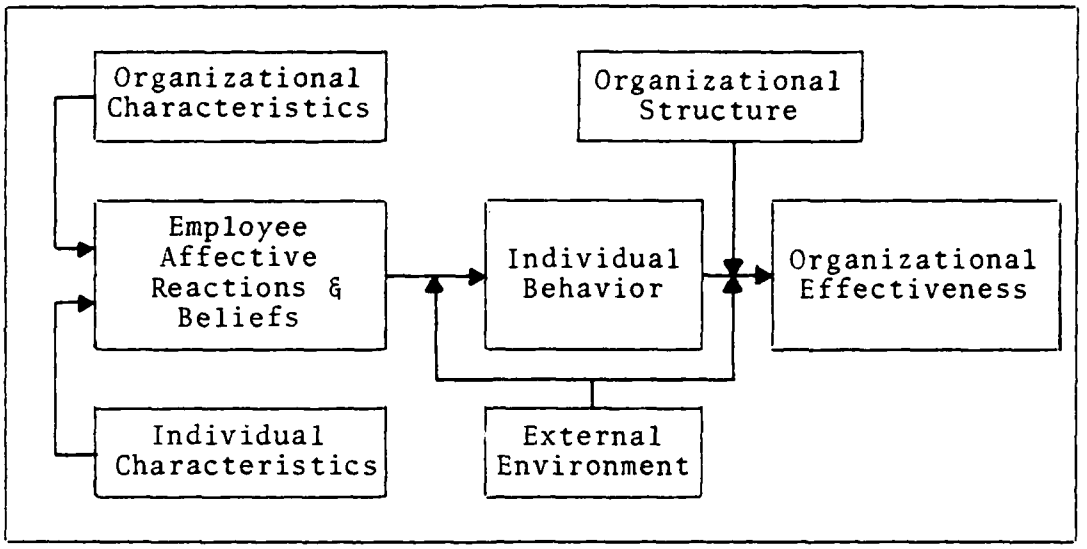

Figure 2-1

Model of Determinants of Organizational Effectiveness (adapted from Lawler et al., 1980, p. 107)

variables include systematic differences in individuals that have a relevance to organizational behavior such as skill levels and levels of education, and individual differences in need strength, personality, values, and perceptual biases. For the purposes of this study, organizational level (a subset of organizational characteristics/structure), sex and race[7] (a subset of individual characteristics) will be examined in greater detail.

Organizational Level. Structure, or the unique way an organization arranges its human resources, is usually

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[7]Sex and race, while primarily biological differences, also represent "cultural" differences which can influence values, perceptual biases, etc.

composed of various organizational levels or echelons. This vertical division of an organization into hierarchical levels involves real and perceived differences in the attributes associated with each level. These differences represent potential conflicts which could affect organizational effectiveness. For example, different organizational levels usually result in differences in material rewards, prestige, power and responsibility (Lawler et al., 1980, p. 169). Other important attributes that vary with organizational level are the formal mechanisms for directing, structuring, or controlling behavior; communication networks; and roles, norms, and expectations for behavior (p. 273). Additionally, Katz and Kahn (1978) noted that the functional demands on formal leaders vary from top echelons entrusted with policy formation, through the middle echelons concerned with piecing-out structure, to the lower echelons charged with routine administration. They suggested that each leadership pattern required different cognitive styles, different degrees and types of knowledge, and different affective characteristics (p. 538). The importance of paying more attention to the vertical dimension of structure within organizations was well-stated by Pfiffner and Sherwood (1960) when they pointed out:

> The differentiation of task between echelons is of more significance to the selection and training of leaders at the several levels than may be indicated by the attention accorded it in the past. The psychological adjustment when one goes from one level to another is often difficult because of the tendency to continue former behavior patterns...[p. 39].

Sex and Race. Individuals of different sex and race groups possess different outlooks, goals, needs, and abilities (Campbell et al., 1976, p. 395). These human variations cause people to behave differently from one another when placed in the same work environment. Moreover, these differences can have a direct bearing on organizational effectiveness. Campbell (1976) explains that it is not so much the physiological differences, but the social-psychological or "cultural" differences that differentiate the two minority groups from the white, male majority.

> To an important degree, men and women grow up in different "cultures," develop different expectations, learn different roles, and live different lives. The same may be said of whites and blacks. No doubt these patterns are changing and these differences may be diminishing as time passes, but it remains a fact of American life that sexes and races differ not only on their physiological attributes, but in their social-psychological characteristics as well [p. 39].

As Campbell implied, both groups are in the process of change with respect to their aspirations, perceptions, expectations and values. Through the revolution in race relations (beginning in the 1960's) and the more recent women's "movement," both of these groups are attempting to lift themselves out of generations of psychological and economical discrimination. However, along with the change in needs, values, and perceptions comes the potential for frustration and dissatisfaction when one's rising expectations are not fulfilled in their particular work situation. Terborg (1977), for example, attests to the powerful effect sexual stereotypes and roles continue to have on people's behavior and the reaction one

has to work and its demands. Quinn and Staines (1979) surmise that the general declining trend in job satisfaction in America may be a result of a change in the composition of the work force (in terms of sex, race, and age), objective qualities of jobs, and the rise in expectations (p. 308).

Organizational Level, Sex, and Race--the Potential Problems

To understand where the potential problems may be requires an understanding of the concept of "fit," or the degree of congruence between the organizational and individual inputs. For example, in the context of this study, dysfunctional behavior could be anticipated if the demands, goals, objectives, rewards, and roles associated with a particular organizational level are not congruent[8] with the abilities, goals, objectives, needs, and expectations of the individual (Lawler et al., 1980, p. 274; Steers, 1977, p. 130). When individuals enter an organization, they bring with them their expectations about work behavior based on their background and socialization. The individual is assigned to a particular job/organizational level based on the needs and goals of the organization. If there is a good "fit," in other words, a high degree of congruence between the organization's and the individual's objectives, goals, and expectations, all other things being equal, organizational effectiveness

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[8]"Not congruent" means there is more disparity than agreement. It is a matter of degree.

(productivity, job satisfaction) will be enhanced (Schein, 1970; Hackman and Oldman, 1975). On the other hand, a bad "fit" could result in dissatisfaction, frustration, and turnover. Additionally, as a worker matures, his or her valuation of the rewards associated with their particular organizational level may change; therefore, lack of promotion to higher levels may cause a lack of "fit" at a later time (Kalleberg, 1977). However, it is important to note that different individuals have different needs. Advancement to a higher level may not be a motivator if the individual's needs, interests, or abilities are not congruent with the job (Hulin, 1971; Holland, 1976). Problems in congruency can involve any individual regardless of sex or race, but what makes the female and black minorities so vulnerable is that their expectations are changing. Their standards of comparison, which encompass such concepts as expectations and aspiration levels, reference group levels, needs and equity levels, are changing as new career opportunities become available (Campbell et al., 1976, p. 297).

Air Force Situation--
Organizational Level, Sex
and Race

The Air Force has traditionally been a predominantly male and predominantly white service. Organizationally, it has been characterized by a rigid, hierarchical structure (chain-of-command), where each successively higher level has more power, responsibility, and prestige than the preceding

level. In addition to the organizational hierarchy, there is also a hierarchical rank or grade structure. Within that context, the number of blacks and women in the Air Force has steadily increased over the past few years (Table 2-4) and is anticipated to continue that trend (Gates, 1980; U.S. Bureau of Census, 1980). In fact, while the total force strength has continually decreased over the past few years, the number of women and blacks in the Air Force has steadily increased. Additionally, as a result of the Air Force's Equal Opportunity and Treatment (EOT) policy,[9] many new assignment and career opportunities have been opened up to Air Force minorities. With the exception of the legal restriction barring Air Force females from combat,[10] all Air Force members, regardless of sex or race, are afforded equal opportunity with respect to career-field choice, promotion, and assignments.

Thus, with the hierarchical structure and with rising minority expectations, increasing minority populations, and

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[9]Air Force Standards, Air Force Regulation (AFR) 30-1, 1977, para. 18; and Socal Actions Program, AFR 30-2, 1976, para. 6-1.

[10]The legal restrictions against using Air Force females in combat are found in Title 10, Section 8549, United States Code. "Female members of the Air Force, except as provided in Section 8067, may not be assigned duty in aircraft engaged in combat missions [p. 785]." Section 8067 outlines procedures for assigning medical, legal, and chapel personnel to combat zones. Section 8067 makes it clear that the duties of such personnel are support functions and not combative in nature. The Air Force has interpreted 8549 to exclude women from positions where there is a high risk of capture or injury because of hostile action.

TABLE 2-4

USAF Military Personnel By Race and Sex

Year		Force	White	Black	Other
1980	Total	553,558	459,459	79,544	14,555
	Male	493,653	412,201	69,308	12,144
	Female	59,905	47,258	10,236	2,411
1979	Total	555,083	464,311	76,748	14,024
	Male	501,853	423,147	67,987	10,719
	Female	53,230	41,164	8,761	3,305
1978	Total	565,104	478,957	73,494	12,653
	Male	518,385	440,003	66,831	11,551
	Female	46,719	38,954	6,663	1,102

Adapted from "An Air Force Almanac: USAF in Facts and Figures," Air Force Magazine, May 1979, 1980, 1981.

expanded career opportunities, the question is: "Within this Air Force environment, do members of different sex and race groups differ on the three criteria of effectiveness at different organizational levels?"

Research Findings

Organizational Level. This is a brief summary of the research on organizational level. Katz and Kahn (1978) state that the vertical dimension differentiates people according to power, privilege, prestige, and rewards of their organizational position (p. 76). This view is shared by Lawler et al. (1980) and Steers (1977). Along that same line, Coates and Pellegrin (1957), in a study directed primarily toward self-perceptions, found that both supervisors and subordinates

were aware of the rewards and the sacrifices associated with high-level positions (p. 220). Additionally, Katz and Kahn (1978) in their three basic patterns of leadership (i.e., origination, interpolation, and administration) state that there is a relationship between the patterns of leadership and the hierarchical levels of position in the organization. The functional demands on formal leaders vary from the top echelons entrusted with policy formation, through the middle echelons concerned with piecing-out structure, to the lower levels charged with routine administration. Additionally, these three patterns of leadership call for different cognitive styles, different degrees and types of knowledge, and different affective characteristics. Leadership skills appropriate at one level of the organization may be irrelevant or dysfunctional at another (pp. 535-539). The view that leadership/managerial styles can vary with the situation is a common one among contingency theories. (See Hendrix, 1976, for a review of contingency approaches to leadership.)

Job motivation has been shown to vary with organizational level. Porter (1961, 1963) examined the five need areas of security, social, esteem, autonomy, and self-actualization. Results showed higher-level managers placed relatively more importance on self-actualization and autonomy needs than did lower-level managers (also Tannenbaum, 1974). Additionally, self-actualization and autonomy are the least well-satisfied managerial needs (Haire, Ghiselli, and Porter, 1963; Porter, 1961). According to Dunnette (1967), pay is a

strong motivator for managerial personnel at all levels. There is also considerable uniformity in the results, which indicate that the higher the manager's position, the greater his drive and motivation for achievement.

Job satisfaction has shown a strong relationship to organizational level. Porter and Lawler (1965) reviewed the literature on the relationship between organizational structure and job satisfaction. They found that each higher level of manager is more highly satisfied than the next lower level. "Studies seem nearly unanimous in concluding that job satisfaction does increase monotonically with increasing levels of management [p. 50]" (also Kalleberg, 1977; Quinn and Staines, 1979). Along this theme, several authors have noted problems with changing organizational levels. Pfiffner and Sherwood (1960) state that "the psychological adjustment necessary when one goes from one level to another is often difficult because of the tendency to continue former behavior patterns... [p. 139]." Additionally, Stogdill (1974) states that "a higher status position involves change in responsibility and accountability for results. Not all members of an organization welcome upward mobility [p. 213]."

With regard to organizational climate, Payne and Mansfield (1973) and Gorman and Mallory (1972) both showed that people higher in the organization had more positive views about the organization. There is also some evidence that a positive relationship exists between climate and job satisfaction (Steers, 1977, pp. 108-109).

Finally, within the military, Hendrix (1980) has shown that job satisfaction, perceived productivity, and organizational climate all demonstrate general increasing trends with increasing organizational levels.

Sex and Race. The following is a review of some of the more pertinent literature on sex and race. Parnes, Egge, Kohen, and Schmidt (1970), Holland (1976), and Campbell et al. (1976) summarize the many ways in which the culture molds the aspirations, employment opportunities, and rewards for women and blacks. For instance, they show how the culture "teaches" women and blacks, in contrast to white men, to aspire to a narrower range of occupations, and to expect less vocational achievement. The culture reinforces this early education by discriminatory training, hiring, and promotional practices so that the expectations of women and blacks are confirmed. All authors stress that the differences in attitudes, values, and expectations are cultural or learned rather than innate.

Terborg (1977), McClelland (1965), and O'Leary (1974) all report that women as a group describe themselves as different or even opposite to men as a group on occupational traits. Schein (1973, 1975) has shown that these beliefs are shared by both male and female managers as well. Macoby and Jacklin (1974), in an extensive review of sex differences conclude that self-confidence is one achievement-related characteristic that consistently differentiates the sexes. Along this same theme, Korman (1970) concluded that all things being

equal, people will choose careers that are consistent with their beliefs about themselves. Campbell et al., Holland, and Parnes et al., of course, attribute this inferior self-concept to socialization rather than physiology. Rosenbach (1979) found that while job satisfaction did increase with increasingly higher levels within the organization, that when job level is held constant, women's and men's perceptions of their jobs are similar. He concluded that differences attributed to sex were really a function of organizational opportunity structure, power systems, and sex ratios.

In terms of job satisfaction, Andrisiani, Appelbaum, Koppel, and Miljus (1978), Quinn et al. (1979), Campbell et al. (1976) all report that in terms of overall job satisfaction, there is no significant difference between men and women. It is only when you look at them in subsets against other variables that differences surface (e.g., males vs. females with respect to pay). Blacks were less satisfied than whites in overall satisfaction. Different variables that tended to confound results are age and education. Brief and Aldag (1975) cautioned about the dangers of generalizing about job attribute preferences (e.g., men prefer career-related outcomes; women prefer outcomes associated with social aspects). While preferences may vary from file clerk to executive, these differences may not be present at the same occupational level (similar to Rosenbach, 1979). Weaver (1978) showed that the correlates for job satisfaction were the same for both races. However, while supervisory position and occupational prestige

significantly correlated with job satisfaction for whites, the results were spurious for blacks. He concluded that while both races may share common beliefs about the hierarchy of occupations, its correlation with job satisfaction is not as strong for blacks. Wilson (1978) hypothesizes the determinants of black satisfaction may be different than those of white satisfaction. Slocum (1972) reported that blacks were significantly lower on six intrinsic job factors: opportunity to help people, opportunity for friendship, self-esteem, opportunity for independent thought/actions, opportunity for growth and development, and compensation.

Summary

The purpose of this final section was two-fold. First, it continued the dominant theme of the chapter by emphasizing the importance of situational variables in examining organizational effectiveness. Second, it completed the transition from organizational effectiveness, in general, to the specific research question. In essence, this section provided the basis for this research effort by: (1) hypothesizing how organizational level, sex, and race could impact organizational effectiveness; (2) examining the nature of the Air Force with respect to these variables; and (3) reviewing relevant research findings with respect to these variables and organizational effectiveness.

CHAPTER 3

METHODOLOGY

Introduction

The purpose of this chapter is to explain the methods used to collect the research data, establish the research sample, identify and measure the research variables; to explain the statistical procedures used to analyze the research data; and to explain the general research approach.

Collecting the Research Data

Survey Instrument

The research data were collected by means of the OAP, a survey instrument specifically designed to measure the components of the Three Component Model. The OAP (Version 3) contained six sections: (1) Background Information, (2) Job Inventory, (3) Perceived Productivity (Inventory), (4) Supervisory Inventory, (5) Organization Climate Inventory, and (6) Job Satisfaction Questionnaire. With the exception of the Background Information Section, where a multiple choice scale was used, all sections of the OAP used a seven-point[11] closed response rating scale (see Appendix B for a copy of OAP,

[11]Some contained a "0" point for "not applicable."

Version 3).

Source

The data base used in this research effort is the same as that used by Hendrix and Halverson (1979a) and Hester (1980). The data were collected by LMDC travel teams who administered the OAP at selected Air Force installations to all available personnel. A sample of 4,786 individuals (military and civilian) was collected from five Air Force bases representing six major commands. The composition of the sample, adapted from Hendrix and Halverson (1979a, p. 11), is summarized in Table 3-1.

TABLE 3-1

Composition of Survey Respondents

Officer	17%
Enlisted	66%
Civilian	17%
Male	86%
Female	14%
White	78%
Black	10%
Hispanic	5%
Other	7%

The data were transferred from the Technical Services Division of the Air Force Human Resources Laboratory (AFHRL/TS) at Brooks AFB, Texas in the form of a magnetic computer tape. The tape contained 4,786 cases; each case consisted of 165 responses, a 13-digit structure code, and a five-digit Air Force specialty code (Hester, 1980, p. 51).

Establishing the Research Sample

Modification of OAP Data

For the purposes of this study, only a subset of the original data base was required; therefore, modifications to the OAP data were made to establish the research sample.

Air Force Military Personnel. In establishing the research sample, the original OAP data which included military and civilian personnel was reduced to include Air Force military personnel only. This was accomplished by selecting only the cases with either response one or two to Question 1 of the Background Information section of the OAP:

1. You are:
   (1) Officer
   (2) Airman
   (3) Civilian (GS)
   (4) Civilian (Wage Employee)
   (5) Non-Appropriated Fund (NAF)
   (6) Other

Rationale for implementing this restriction is best stated by Gould (1978):

> The military work environment and facets relating to job satisfaction do differ substantially from their civilian counterparts. It is quite possible that, for active duty military personnel, the work environment has a more pronounced interaction with their total life space; hence, components of the work environment take on different meanings than for civilian employees [p. 9].

Moskos (1976) similarly, on the question of whether the military is an occupation or an institution, concluded that military life is a lifestyle rather than just a type of job (pp. 1-5). The point is that these differences between military and civilian personnel with respect to their work environment could have a confounding effect on perceptions of

organizational effectiveness (i.e., job satisfaction, etc.) which are beyond the scope of this study.

Supervisors. From the original OAP data, the research sample was further reduced by selecting only those Air Force military personnel who were supervisors. This was accomplished by selecting only those cases with responses two through seven on Question 9 of the Background Information section:

9. How many people do you directly supervise?
   (1) None
   (2) 1 to 2
   (3) 3 to 5
   (4) 6 to 8
   (5) 9 to 12
   (6) 13 to 20
   (7) 21 or more

The limiting of the research sample to "supervisors only" was a restriction basic to the research question. Additionally, an individual's managerial style has little meaning in the context of the Three Component Model if the individual is not in a position (i.e., supervisory) where their "style" can influence subordinate behavior which, in turn, can influence organizational effectiveness.

Race. The research sample was further limited to Air Force military supervisors who were either black or white --responses three and five, respectively, to Question 5 of the Background Information section:

5. Your race is:
   (1) American Indian or Alaskan Native
   (2) Asian or Pacific Islander
   (3) Black, not Hispanic Origin
   (4) Hispanic
   (5) White, not Hispanic Origin
   (6) Other

Other races were excluded from the research sample because they represented relatively smaller subsets of the OAP data

base. When these smaller subsets are further reduced due to research design restrictions (i.e., military supervisors only), and then are partitioned by sex and organizational level, the resulting cell sizes could become so small that statistically meaningful inferences about the parent population become impossible.

Organizational Level. In the original LMDC data base individual cases were categorized into nine possible organizational levels. These nine organizational levels were coded in a general hierarchical pattern from highest, code 1, to lowest, code 9 (see Table 3-2).

TABLE 3-2

Organizational Levels

Organizational Level Code	Organization/Agency
1	Headquarters USAF
2	Major Commands/Special Operating Agencies
3	Numbered Air Force
4	Air Division
5	Wing
6	Group/Base
7	Squadron
8	Medical
9	Specialized Activities

From Hendrix and Halverson, 1980, p. 19.

In developing the research sample for this study, organizational code 8, Medical, was excluded from the analysis. From this researcher's perspective, "medical" is more appropriately

a functional classification of the "type" of work[12] an individual performed (e.g., medical, maintenance, operations, engineering, research, etc.), and not an organizational "level" where the work was performed. The medical field is represented by organizational entities at the Headquarters USAF and major command levels. Below the major command level, the medical units are organized into a hierarchical structure ranging from medical centers, to regional hospitals, to base hospitals, down to clinics. These medical units are normally attached to a "parent" wing or airbase group for administrative purposes. Therefore, pooling individuals into a "medical" category does not accurately identify the organizational level of those individuals. To eliminate this problem, all cases with organizational level code 8 were excluded from the analysis.

Additionally, it was determined that any organizational level with 30 or less cases in the research sample would be eliminated from further analysis due to an insufficient number of observations.

Identifying and Measuring the Research Variables

Criterion Variables

In this research effort the criterion variables are the three measures of organizational effectiveness for the

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[12]Type of work is analogous to the Work Group Codes of Hendrix and Halverson, 1980, pp. 20-21.

Three Component Model--job satisfaction, perceived productivity, and organizational climate.

Job Satisfaction. The job satisfaction variable represents an individual's overall perception of the degree to which they are satisfied or dissatisfied with the various facets of their job. For each case this variable was derived by computing the simple average of the individual responses to the 20-question Job Satisfaction Questionnaire of the OAP[13] (Questions 146-165 in Appendix B).

Perceived Productivity. The perceived productivity variable represents an individual's overall perception of their work group's productivity in terms of the quantity and the quality of work output. For each case this variable was derived by computing the simple average of the 7-question Perceived Productivity (Inventory) of the OAP (Questions 75-81 in Appendix B).

Organizational Climate. The organizational climate variable is an overall measure of an individual's perceptions of various characteristics of their organization (e.g., communications, employee concern, employee commitment, recognition, etc.). For each case this variable was derived by computing a simple average from the responses to the 23-question Organization Climate Inventory of the OAP (Questions

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[13]The variables job satisfaction, perceived productivity, and organizational climate are all simple averages of various questions in the OAP. This was the prescribed way of computing these factors for this version of the OAP as outlined by LMDC pamphlet, "Organizational Assessment Package Output," LMDC/Directorate of Research, Maxwell AFB AL, undated.

123-145 in Appendix B).

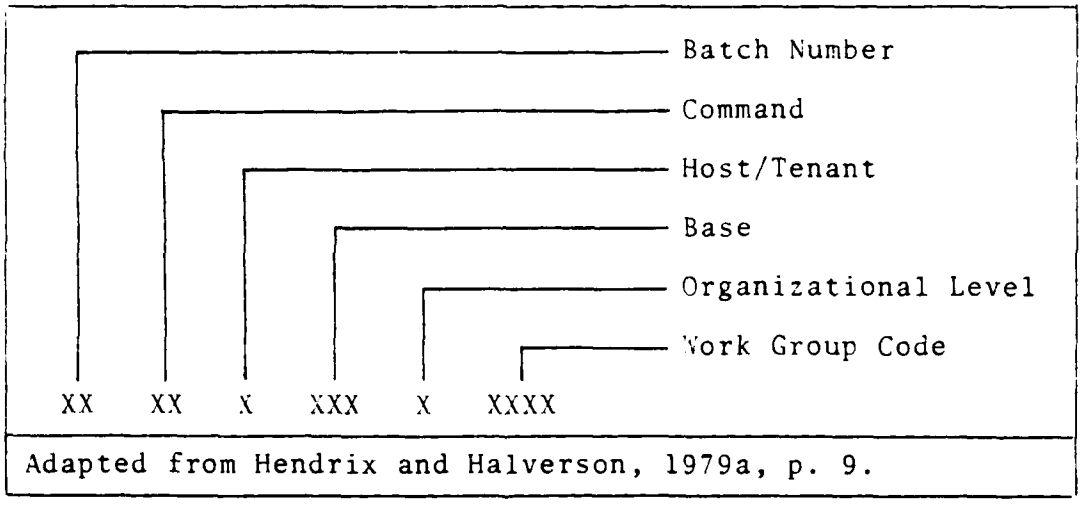
Predictor Variables

The three predictor variables used in this study were organizational level, sex, and race.

Organizational Level. The organizational level of an individual case was determined by the one-digit organizational level code in the 13-digit structure code of the OAP (Table 3-3).

TABLE 3-3

Structure Code



Adapted from Hendrix and Halverson, 1979a, p. 9.

As discussed previously in the section on establishing the research sample, organizational level codes took on the values of one through seven, and nine (Table 3-2).

Sex. An individual's sex was determined by the responses to Question 6 of the Background Information section of the OAP (Appendix B).

6. Your sex is:
   (1) Male
   (2) Female

Race. An individual's race was determined by the response to Question 5 of the Background Information section of the OAP. As previously discussed, this research effort was limited to responses three and five, which are black and white respectively.

Statistical Procedures

Analysis of Variance

The primary statistical procedure employed in this study was the analysis of variance (ANOVA) procedure. ANOVA is a statistical method for simultaneously investigating the differences among the means of several populations. Stated simply, ANOVA estimates how much of the total variation in a set of data can be attributed to certain "effects" and how much can be attributed to chance (Harnett ,1975, p. 503). In the context of this study, one three-way ANOVA was run for each of the criterion variables (i.e., job satisfaction, perceived productivity, and organizational climate) to determine how much of their variability was attributable to the three factors (i.e., organizational level, sex, and race) and/or unique combinations of these factors. Organizational level will be referred to as "factor A" with "p" factor levels corresponding to the various organizational levels. Sex, as the second factor, will be referred to as "factor B" with "q" factor levels corresponding to male and female. Finally,

"factor C" represents race with "r" factor levels, black and white. Combinations (i.e., pqr) of the various levels of factor A with the factor levels of B and C represent the possible treatments on the research sample.

Fixed Effects Model. The following fixed effects model expresses the conceptual basis for the three-way ANOVA for fixed categories of factors.

$$X_{ijkl} = \mu+\alpha_i+\beta_j+\gamma_k+\alpha\beta_{ij}+\alpha\gamma_{ik}+\beta\gamma_{jk}+\alpha\beta\gamma_{ijk}+\varepsilon_{ijkl} \qquad (3\text{-}1)$$

where:

X_{ijkl} = l^{th} observation of treatment ijk,

μ = overall population mean,

α_i = main effect for factor A at the i^{th} level,

β_j = main effect for factor B at the j^{th} level,

γ_k = main effect for factor C at the k^{th} level,

$\alpha\beta_{ij}$ = two-way interaction effect of treatment combination ij,

$\alpha\gamma_{ik}$ = two-way interaction effect of treatment combination ik,

$\beta\gamma_{jk}$ = two-way interaction effect of treatment combination jk,

$\alpha\beta\gamma_{ijk}$ = three-way interaction effect of treatment combination ijk,

ε_{ijkl} = error effect on the l^{th} observation of treatment ijk.

The model also depicts the possible sources of variation in observed values of the criterion variable (X_{ijkl}). Variations attributed to variation in the different levels of the predictor variables (factors) are called "main effects" and

are defined in terms of population means as:

$$\alpha_i = \mu_{i..} - \mu_{...}$$

$$\beta_j = \mu_{.j.} - \mu_{...}$$

$$\gamma_k = \mu_{..k} - \mu_{...}$$

Variations which cannot be attributed to the factors acting alone, but to the joint effects of two or more acting together through the unique combinations of treatments are called "interactions effects" and are defined as:

$$\alpha\beta_{ij} = \mu_{ij.} - \mu_{...} - \alpha_i - \beta_j$$

$$\alpha\gamma_{ik} = \mu_{i.k} - \mu_{...} - \alpha_i - \gamma_k$$

$$\beta\gamma_{jk} = \mu_{.jk} - \mu_{...} - \beta_j - \gamma_k$$

$$\alpha\beta\gamma_{ijk} = \mu_{ijk} - \mu_{...} - \alpha\beta_{ij} - \alpha\gamma_{ik} - \beta\gamma_{jk} - \alpha_i - \beta_j - \gamma_k$$

Variation not attributed to main effects or interaction effects is the unexplained effect that is associated with random error.

Should an interaction term in the ANOVA prove to be statistically significant, it is generally necessary to analyze "simple effects" rather than the main effects and interaction effects. Simple effects are associated with both main effects and interaction effects. The former are called "simple main effects," and the latter "simple interaction effects." Representative definitions of simple effects are:

the simple main effect of A_i for c_k is;

$$\alpha_{i(c_k)} = \mu_{i.k} - \mu_{..k}$$

the simple main effect of B_j for c_k is;

$$\beta_{j(c_k)} = \mu_{\cdot jk} - \mu_{\cdot\cdot k}$$

the simple interaction effect of AB_{ij} for c_k is;

$$\alpha\beta_{ij(c_k)} = \mu_{ijk} - \mu_{\cdot\cdot k} - \alpha_{i(c_k)} - \beta_{j(c_k)}$$

It should be noted that the simple effects have the same general form as the main effects and interaction effects; simple effects, however, are restricted to a single level of one or more factors. The degree to which the main effects approximate the simple main effects depends upon magnitudes of interactions. In the absence of interactions, main effects will be equal to corresponding simple effects.[14]

Partition of Variance. The variability of all the observed values of the criterion variable is proportional to the sum of squares of deviations about the population mean. The measure of variability is called "total sum of squares of deviations" (TOTAL SS). The ANOVA procedure partitions the TOTAL SS into parts. The variation due to main effects is the sum of squares of factor A, SSA (similarly, SSB and SSC).[15]

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[14]For a detailed explanation of simple effects, see Winer, B.J., Statistical Principles in Experimental Design, New York: McGraw-Hill, 1962, pp. 174-178 and pp. 232-239.

[15]Simple Main Effect Example. The variation due to the simple main effects of factor A at level k of factor C, SSA for c_k, is related to the variation of the main effect of factor A and the AC interaction. Specifically, Σ_k SSA for c_k = SSA + SSAC.

Variation due to the interaction effect of factors A and B is the sum of squares of factor A and factor B, SSAB (similarly, SSAC, SSBC). The SSABC is the variation due to the interaction of factors A, B, and C. Finally, the sum of squares of error, SSE, refers to variation due to random error.

Mean Squares. Estimates of variance are represented by mean squares obtained by dividing the partitioned sums of squares by their associated degrees of freedom. Therefore, if there are "n" total observations:

$$MSA = \frac{SSA}{p-1} \tag{3-2}$$

$$MSB = \frac{SSB}{q-1} \tag{3-3}$$

$$MSC = \frac{SSC}{r-1} \tag{3-4}$$

$$MSAB = \frac{SSAB}{(p-1)(q-1)} \tag{3-5}$$

$$MSAC = \frac{SSAC}{(p-1)(r-1)} \tag{3-6}$$

$$MSBC = \frac{SSBC}{(q-1)(r-1)} \tag{3-7}$$

$$MSABC = \frac{SSABC}{(p-1)(q-1)(r-1)} \tag{3-8}$$

$$MSE = \frac{SSE}{pqr(n-1)} \tag{3-9}$$

F-Ratio Test. If the variance of the criterion variable is related to an effect (main or interaction), the proportion of the TOTAL SS attributed to that source will be large. The F-test can detect this by comparing the estimated variance associated with that source (e.g., MSA) to the

estimated error variance (MSE). Therefore, in this example, if MSA is significantly larger than MSE, a large value of F will result.[16] Thus this F-test would reject a hypothesis of "no effect" and indicate a relationship between factor A and the criterion variable.

Hypothesis Testing. Seven hypothesis tests are associated with each three-way ANOVA. Three tests involve the main effects of the factors. The significance of the main effect of organizational level, for example, is determined by testing the hypothesis of no differences between the main effects of factor A:

$$H_o: \alpha_i = 0 \text{ , for all } i$$[17]

$$H_a: \alpha_i \neq 0 \text{ , for some } i$$

This hypothesis is tested by the F-ratio:

$$F = \frac{MSA}{MSE} \qquad (3\text{-}10)$$

with (p-1) and pqr(n-1) degrees of freedom. The significance of the main effects of sex and race are determined in a similar fashion.

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[16]The observed or calculated F (e.g., MSA/MSE) must be greater than the critical value of the F distribution for the corresponding degrees of freedom (e.g., (p-1), (pqr)(n-1)) at the specified significance level (e.g., .05).

[17]This null hypothesis is equivalent to $\sigma_\alpha^2 = 0$; or $\mu_{1..} = \mu_{2..} \cdots = \mu_{p..} = \mu_{...}$

Three tests are associated with the two-way interaction effects. The presence of a significant interaction effect is determined by testing the hypothesis of no interaction effect. For the two-way interaction between sex and race, for example, the hypothesis would be:

$$H_o: \ \beta\gamma_{jk} = 0 \ , \text{ for all } j \text{ and } k$$

$$H_a: \ \beta\gamma_{jk} \neq 0 \ , \text{ for some } j \text{ or } k$$

tested by the F-ratio:

$$F = \frac{MSBC}{MSE} \tag{3-11}$$

with (q-1)(r-1) and pqr(n-1) degrees of freedom. A significantly large value of F would indicate interaction. The significance of the other two-way interactions are determined in a similar fashion.

The final test is for the three-way interaction effect between organizational level, sex, and race. The hypothesis would be:

$$H_o: \ \alpha\beta\gamma_{ijk} = 0 \ , \text{ for all } ijk$$

$$H_a: \ \alpha\beta\gamma_{ijk} \neq 0 \ , \text{ for some } i, j, \text{ or } k$$

tested by the F-ratio:

$$F = \frac{MSABC}{MSE} \tag{3-12}$$

with (p-1)(q-1)(r-1) and pqr(n-1) degrees of freedom. A significantly large value of F would indicate interaction.

Significance Level. The level of significance, or acceptable risk associated with committing a type I error,

was set at 0.05 for all F-tests. In other words, on the average, the chance of rejecting a true hypothesis strictly by chance is one in twenty.

Assumptions. The following assumptions were made when applying the F-ratio test in the fixed effects model for ANOVA (Harnett, 1975, p. 493).

1. The random-error terms ε_{ijkl} are normally distributed with mean zero and variances (σ^2) exactly the same for each treatment ijk.

2. The random-error terms are independent, both within each treatment ijk, and across treatments.

Computer Program. The SPSS subprogram ANOVA was used to perform the analyses of variance in this research effort (Nie, Hull, Jenkins, Steinbrenner, and Bent, 1975, pp. 398-433).

Newman-Keuls Sequential Range Test

A second statistical procedure used in the data analysis was the Newman-Keuls sequential range test. The Newman-Keuls test probes the nature of the differences between treatment means following a significant F-ratio test. A significant F-ratio test leads to a rejection of the null hypothesis (i.e., H_0: no effects) at a given significance level. This is an indication that there are differences among the factor level means. Such a result, however, does not provide any information regarding differences between pairs of factor levels. For example, in a three-way ANOVA with job

satisfaction by organizational level, sex, and race, a significant F-ratio test for factor A, organizational level (assuming no significant interactions), would indicate that job satisfaction is significantly different for at least one of the pairwise comparisons of organizational levels; but it does not indicate which differences are significant and which are not. The Newman-Keuls is a posteriori multiple comparison test which compares all possible pairs of factor levels. The factor levels are divided into homogeneous subsets, where the difference in the means of any two levels in a subset is not significant at some prescribed significance level.

Procedure. The Newman-Keuls procedure is best explained by using a numerical example. Part (i) of Table 3-4 gives the treatment means arranged in order of increasing magnitude. The differences between all possible pairs of means are shown. For example, the entry 7.18 in the first row is the difference between 9.43 and 2.25. The critical values, q_r, presented in part (ii) are found in tables for studentized range statistics and are a function of the specified significance level (e.g., .01), an r-value or the number of steps the means are apart (e.g., r = 2,3,4), and the degrees of freedom for the MSE (e.g., 22). In making several tests, it is convenient to work with the critical value of the difference between a pair of means rather than q_r. This is accomplished by multiplying the q_r values by $\sqrt{MSE/\tilde{n}}$; where $\tilde{n}$ is the harmonic mean of the cell sizes calculated by:

$$\tilde{n} = \frac{m}{(1/n_1) + (1/n_2) + \ldots + (1/n_m)} \qquad (3\text{-}13)$$

In this example the numerical value of $\sqrt{MSE/\tilde{n}}$ is $\sqrt{3.33/6.30} = .727$; therefore, the critical values of part (ii) are multiplied by .727 to arrive at the values in part (iii). The tests for significant difference are made by comparing the differences in means from part (i) with the critical value of the difference in means, part (iii), for a given range (e.g., r = 4). The sequence of tests starts in the upper right of part (i) and proceeds to the left across that row until the part (iii) value is larger than the part (i) value. Tests are then performed on the second and third row in a similar fashion. Part (iv) provides a summary of the significant differences between treatment means. In other words, treatments 2 and 4 differ from treatments 3 and 1, but there is no significant difference between treatments 2 and 4 and no significant difference between 3 and 1.[18]

Research Approach

The basic research approach began by modifying the LMDC-provided data base to establish the appropriate research sample. Then to adequately address the research question, three separate three-way ANOVAs, one for each criterion

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[18] A detailed explanation of the Newman-Keuls Sequential Range Test and q_r statistic can be found in Winer, 1962, pp. 80-85 and 100-104.

TABLE 3-4

Newman-Keuls Numerical Example

Part	Treatment		3	1	2	4
(i)		Means	2.25	3.00	7.00	9.43
	3	2.25	--	0.75	4.75	7.18
	1	3.00		--	4.00	6.43
	2	7.00			--	2.43
	4	9.43				--
				r=2	r=3	r=4
(ii)		q.99(r,22)		3.99	4.59	4.96
(iii)	$\sqrt{MSE/\tilde{n}}$	q.99(r,22)		2.90	3.34	3.61
(iv)	Treatment		3	1	2	4
	3				**	**
	1				**	**
	2					
	4					
	**significantly different (p = .01)					

variable, were performed. For each ANOVA, there were seven hypotheses that were F-tested for significant effects. If all seven tests resulted in no significant effects, then the conclusion could be drawn that the three predictor variables/ factors had no effect on that criterion variable. If there were significant main effects, but no significant interaction effects, then the Newman-Keuls test was performed on the significant factor(s) to determine if there were significant differences between factor levels. If, on the other hand, there were significant interaction effects, then appropriate simple main effects were calculated with the Newman-Keuls test being performed on the significant simple main effects. This approach was then performed on the remaining two ANOVAs in a similar manner.

CHAPTER 4

RESULTS

Introduction

This chapter presents the results of the statistical analyses used to answer the research question. The chapter begins with a description of the research sample resulting from modifications to the LMDC-provided data base. Next, results are presented for three analyses of variance, one for each organizational effectiveness criterion variable.

Research Sample

Description

Tailoring the research sample to address the specific research question required modifications (as outlined in Chapter 3) to the OAP (Version 3) data base. As a result of those modifications, the research sample for this study was restricted to Air Force military supervisors of both sexes, who are either black or white (n = 1324). Additionally, four organizational levels were eliminated from further analysis due to insufficient observations. Headquarters USAF (code 1, n = 1); Numbered Air Force (code 3, n = 0); Air Division (code 4, n = 0); and Specialized Activities (code 9; n = 0) were deleted. Table 4-1 presents a breakdown of the remaining

TABLE 4-1

Research Sample Breakdown By
Organizational Level, Sex, and Race

Level	Black		White		Totals
	Male	Female	Male	Female	
ORGLVL 2	1	0	54	1	56
ORGLVL 5	19	4	171	8	202
ORGLVL 6	17	4	127	10	158
ORGLVL 7	82	3	782	41	908
Totals	119	11	1134	60	1324

four organizational levels by sex and race.

Limitations

The research sample described in Table 4-1 imposed two limitations on subsequent analyses. The obvious limitation imposed by eliminating four organizational levels was that the analyses did not address the full spectrum of Air Force hierarchical structure. A second limitation was rooted in several small cell sizes in Table 4-1. Should the interpretation of interaction effects be required, these small cells would preclude developing meaningful inferences about the parent population.

Analyses of Variance

Overview

The results of the three-way ANOVAs, one for each criterion variable, are discussed in this section. For each

analysis, the results of all seven hypotheses tests will be addressed. Significant effects will be discussed in detail, accompanied by Newman-Keuls test results and criterion mean score plots. Nonsignificant effects, on the other hand, will be mentioned briefly with corresponding mean score plots grouped by criterion variable in Appendices C through E.

Job Satisfaction By Organizational Level, Sex, and Race

The first three-way ANOVA examined the effects of organizational level, sex, and race on the organizational effectiveness criterion, job satisfaction. Of the several potential sources of variation, only the main effects of organizational level and sex were statistically significant[19] (see Table 4-2). Plots of nonsignificant effects are located in Appendix C.

Main Effects. For organizational level, the observed F-ratio, $F = 21.769$, was larger than the critical value $F_{.95}(3, 1308) = 2.63$; therefore, the null hypothesis of "no effect" was rejected. Since there were no significant interaction effects, the sum of the variations due to simple main effects was equal to the overall main effects. Hence, the Newman-Keuls test was performed to determine which factor level means differed significantly following the significant overall F-test. Organizational level 2, the highest mean

[19] While statistically significant, the two main effects only accounted for approximately 5.5 percent of the job satisfaction variance (i.e., $R^2 = .0548$).

TABLE 4-2

Analysis of Variance, Job Satisfaction by Organizational Level, Sex, and Race

Source of Variation	Sum of Squares	DF	Mean Square	F	Signif of F
Main Effects	68.199	5	13.640	14.693	.001
ORGLVL	60.624	3	20.208	21.769	.001*
SEX	7.984	1	7.984	8.601	.003*
RACE	.008	1	.008	.008	.928
2-Way Interactions	6.711	7	.959	1.033	.406
ORGLVL SEX	.318	3	.106	.114	.952
ORGLVL RACE	5.790	3	1.930	2.079	.101
SEX RACE	.187	1	.187	.202	.653
3-Way Interactions	2.861	3	1.431	1.541	.215
ORGLVL SEX RACE	2.861	3	1.431	1.541	.215
Explained	77.771	15	5.555	5.984	.001
Residual	1215.170	1308	.928		
Total	1292.942	1323	.977		

ETA^2
ORGLVL = .0484
SEX = .0064
R^2 = .0548
*statistically significant ($p \leq .05$)

score, was significantly different from all other levels. Level 7, the lowest mean, was also significantly different from all other levels. Levels 5 and 6, representing intermediate mean scores, differed significantly from levels 2 and 7, but not from each other. These relationships are summarized in part (iv) of Table 4-3 and are displayed graphically in Figure 4-1. These findings for Air Force military supervisors parallel the results of other studies using different populations which have concluded nearly unanimously that job satisfaction does tend to increase with increasing organizational levels (Porter and Lawler, 1965; Quinn and Staines, 1979; and Hendrix and Halverson, 1980, to name a few).

The null hypothesis that the main effects of sex are zero was contradicted as the observed F-ratio for sex, F = 8.601, was larger than the critical value, $F_{.95}(1, 1308)$ = 3.86. Since there were only two factor levels for sex, the significant overall F-test indicated a significant difference between the male and female job satisfaction scores. Therefore, the Newman-Keuls test was not required. The relationship between the higher male mean and the female mean is presented in Figure 4-2.

There was no significant difference between the job satisfaction mean scores due to race (Black = 4.76; White = 4.79).

Two-way Interactions. There were no significant two-way interactions for job satisfaction. As would be expected based on the significant main effects, the plot of

TABLE 4-3

Job Satisfaction, Newman-Keuls Test on Main Effects (ORGLVL)

Part	ORGLVL		7	5	6	2
(i)		Mean	4.66	4.97	5.02	5.52
	7	4.66	--	.31	.36	.86
	5	4.97		--	.05	.55
	6	5.02			--	.50
	2	5.52				--
(ii)				r=2	r=3	r=4
			q.95(r,1308)	2.79	3.35	3.68
(iii)	$\sqrt{.928/132}$		q.95(r,1308)	.234	.281	.309
(iv)	ORGLVL		7	5	6	2
	7			*	*	*
	5					*
	6					*
	2					
	*p = .05					

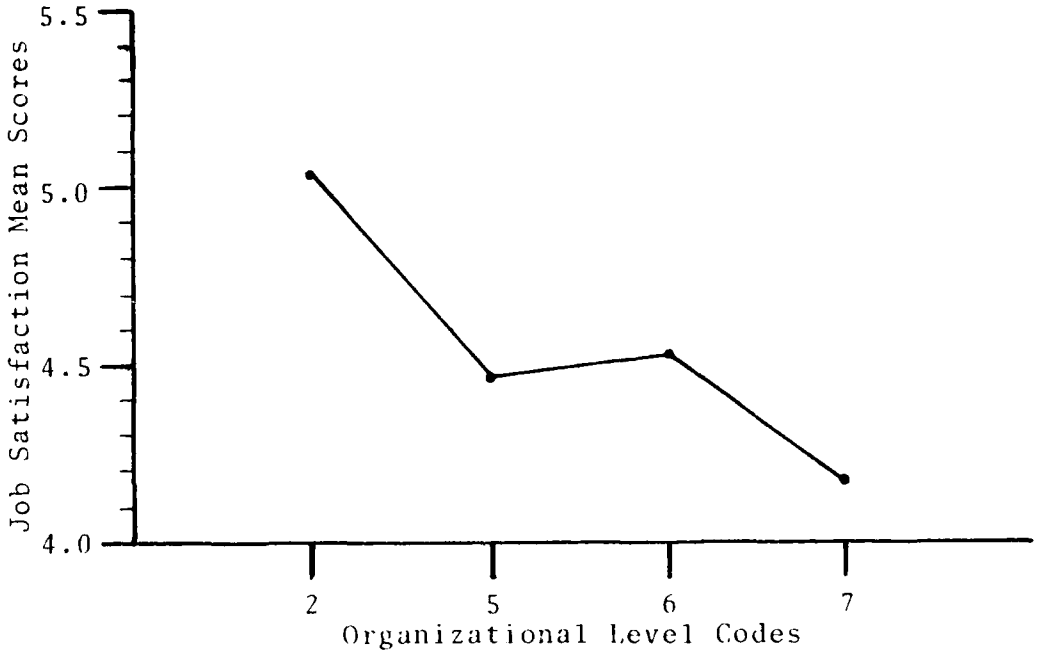

Figure 4-1

Job Satisfaction By Organizational Level

Figure 4-2

Job Satisfaction By Sex

organizational level by sex indicated a general trend of increasing job satisfaction with increasing organizational level and male scores were consistently higher than female scores at all levels. The plot of organizational level by race indicated the same general trend for both races at all organizational levels, except for level 2. However, the total black cell size for level 2 consisted of one observation, making interpretation of the plot meaningless at that level. The plot of race by sex showed the male means higher than the female means for both races.

Three-way Interaction. The three-way interaction between organizational level, sex, and race was not significant. Again, the plot shows the same general increasing trend for all sex-race combinations as organizational level increases. The only discrepancies are black males at level 2 and black females at level 5. However, due to the small cell sizes, these apparent "classic interactions" were not statistically significant.

Perceived Productivity By Organizational Level, Sex, and Race

The second three-way ANOVA examined the effects of organizational level, sex, and race on the organizational effectiveness criterion, perceived productivity. Only the main effects of organizational level and race were statistically significant[20] (see Table 4-4). Plots of nonsignificant

[20]Combined main effects of organizational level and race accounted for less than 3 percent of the perceived productivity variance (i.e., $R^2 = .0269$).

TABLE 4-4

Analysis of Variance, Perceived Productivity by Organizational Level, Sex, and Race

Source of Variation	Sum of Squares	DF	Mean Square	F	Signif of F
Main Effects	28.801	5	5.760	7.147	.001
ORGLVL	17.839	3	5.946	7.378	.001*
SEX	1.269	1	1.269	1.574	.210
RACE	9.926	1	9.926	12.315	.001*
2-Way Interactions	1.713	7	.245	.304	.952
ORGLVL SEX	.885	3	.295	.366	.777
ORGLVL RACE	.619	3	.205	.255	.857
SEX RACE	.082	1	.082	.101	.750
3-Way Interactions	.041	3	.020	.025	.975
ORGLVL SEX RACE	.041	3	.020	.025	.975
Explained	30.555	15	2.182	2.708	.001
Residual	1054.995	1308	.806		
Total	1085.550	1323	.821		

ETA^2
ORGLVL = .0169
RACE = .0100
R^2 = .0269
*statistically significant ($p \leq .05$)

effects are located in Appendix D.

Main Effects. For organizational level, the null hypothesis of "no effect" was rejected since the observed F-ratio, F = 7.378 was larger than the critical value, $F_{.95}(3, 1308) = 2.63$. The Newman-Keuls test for significant differences between the organizational levels provided interesting results. The significant overall F-test indicated that at least one pair of factor level means should be significantly different. However, when the Newman-Keuls test was administered, no significant differences between pairs of factor levels were identified at the .05 significance level (Table 4-5, part (iv)). This apparent contradiction can be explained in one of two ways. First, Winer (1962, p. 78) explains that conflicting results for the F-test and Newman-Keuls test can occur due to the distributions of the populations from which the means were obtained (e.g., means for organizational levels 5 and 2 fall at the same point, 5.58). Second, a closer examination of the Newman-Keuls test (Table 4-5) revealed that only eight one-thousandths of a point separated a significant result from the nonsignificant result obtained (i.e., .280 < .287). The .008 could have been an error attributed to either extrapolation from the studentized range statistic table or rounding-off in the calculation of the critical value. Whatever the reason, based on the fact that the F-test is generally more powerful and leads to more significant results than the Newman-Keuls test (Winer, 1962, pp. 79 and 85), and the observation that this is clearly a

TABLE 4-5

Perceived Productivity, Newman-Keuls Test on Main Effects for Organizational Level (p = .05)

Part	ORGLVL		7	6	5	2
(i)		Mean	5.30	5.46	5.58	5.58
	7	5.30	--	.16	.28	.28
	6	5.46		--	.12	.12
	5	5.58			--	0
	2	5.58				--
(ii)			q.95(r,1308)	r=2 2.79	r=3 3.35	r=4 3.68
(iii)	$\sqrt{.806/132}$		q.95(r,1308)	.218	.261	.287
(iv)	ORGLVL		7	6	5	2
	7 6 5 2		"No significant differences between organizational levels at p = .05."			

borderline situation, the Newman-Keuls test was performed again using a .055 significance level. As anticipated, the higher means, levels 2 and 5 were significantly different from the lowest mean, level 7 (see Table 4-6, part (iv)). This relationship is plotted in Figure 4-3.

The main effect for sex, although the male mean was higher than the female mean (Male = 5.38, Female = 5.24), was not significant.

The null hypothesis of "no effect" for race was rejected as the observed F-ratio, F = 12.316, was greater than the critical value, $F_{.95}(1, 1308) = 3.86$. Since the overall main effect was significant and there were only two factor levels (i.e., black and white), the Newman-Keuls test was not performed on the race main effect. The significantly higher mean for whites is plotted against the black mean in Figure 4-4.

Two-way Interactions. There were no significant two-way interactions for perceived productivity. The plot of organizational level by sex indicated the anticipated general trend toward increased perceived productivity as organizational level increased through level 5 with a slight decrease at level 2. Male scores were slightly higher at all levels except for level 6. The plot of organizational level by race depicts the white mean consistently higher than the black mean at all organizational levels. Additionally, while the white mean increases with each successive increase in organizational level (except slight decrease at level 2), the

TABLE 4-6

Perceived Productivity, Newman-Keuls Test on Main Effects for Organizational Level (p = .055)

Part	ORGLVL		7	6	5	2
(i)		Mean	5.30	5.46	5.58	5.58
	7	5.30	--	.16	.28	.28
	6	5.46		--	.12	.12
	5	5.58			--	0
	2	5.58				--
(ii)				r=2	r=3	r=4
			q.955(r,1308)	2.68	3.25	3.58
(iii)	$\sqrt{MSE/\tilde{n}}$		q.955(r,1308)	.209	.253	.279
(iv)	ORGLVL		7	6	5	2
	7				*	*
	6					
	5					
	2					
	*p = .055					

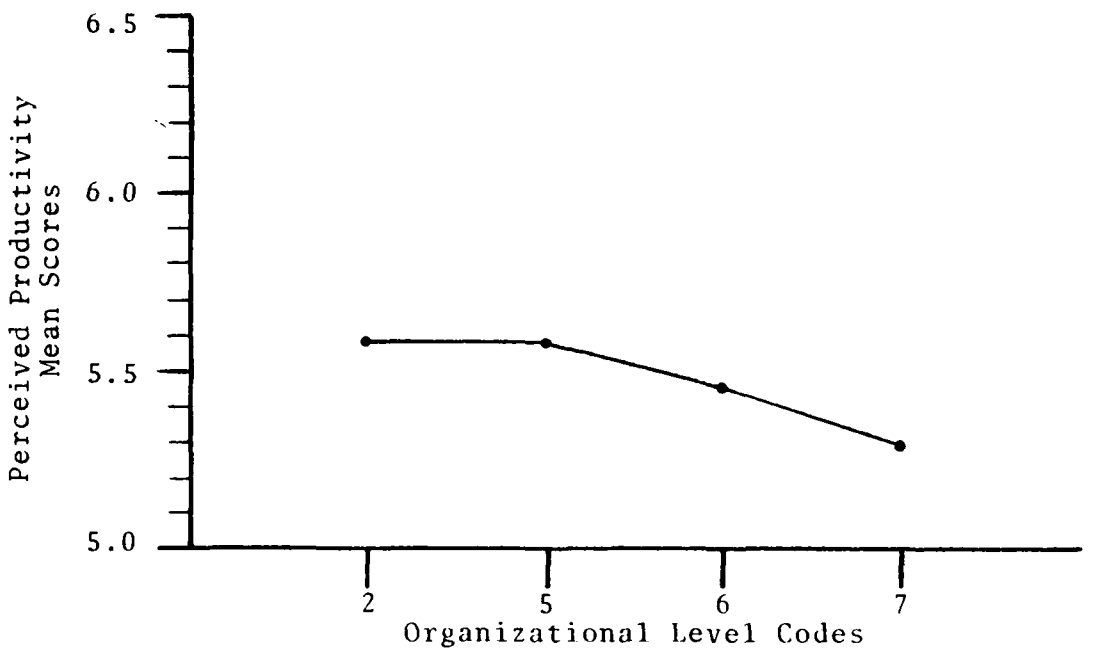

Figure 4-3

Perceived Productivity By Organizational Level

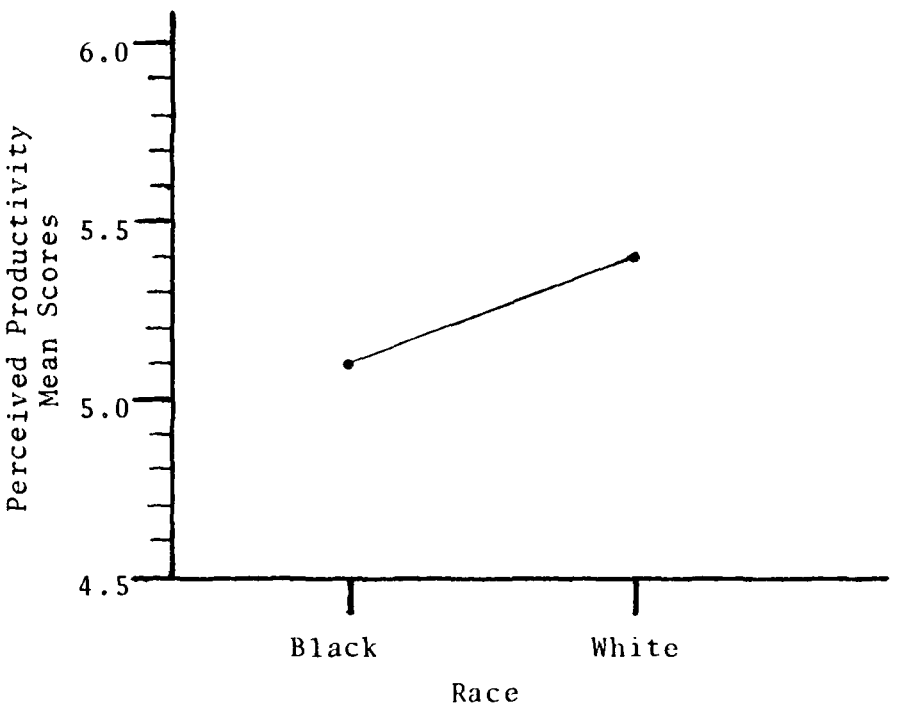

Figure 4-4

Perceived Productivity By Race

black mean showed a decline from levels 6 to 5, and levels 5 to 2 (note: small cell size makes level 2 difficult to interpret). The plot of sex by race shows that black females are slightly higher than white females in perceived productivity mean scores, while the opposite is true for the males. Both differences are insignificantly small.

Three-way Interaction. The three-way interaction was not significant. All sex-race combinations follow the same general upward pattern from level 7 to 6. Then, black mean scores tend to decrease while whites continue to increase from level 6 to 5. From level 5 to 2 all means show a downward trend. Again the small cell sizes are annotated on the graph and must be taken into consideration before making inferences.

Organizational Climate by Organizational Level, Sex, and Race

The final three-way ANOVA examined the effects of organizational level, sex, and race on the effectiveness criterion, organizational climate. The results of the analysis (Table 4-7) indicated that there were significant main effects for organizational level and sex, no significant two-way interactions, and a significant three-way interaction.[21]

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[21] Winer (1962, p. 181) explains how a nonzero three-way interaction is possible when the two-way interactions are zero. Basically, the two-way profiles, for example BC_{jk}, are not parallel for each level of A_i, thus indicating a nonzero three-way interaction. However, the BC profile for the combined levels of factor A are parallel, thus SSBC = 0 and the two-way interaction is zero.

TABLE 4-7

Analysis of Variance, Organizational Climate by Organizational Level, Sex, and Race

Source of Variation	Sum of Squares	DF	Mean Square	F	Signif of F
Main Effects	131.472	5	26.294	16.524	.001
ORGLVL	118.078	3	39.359	24.734	.001*
SEX	13.987	1	13.987	8.790	.003*
RACE	.337	1	.337	.212	.645
2-Way Interactions	4.575	7	.654	.411	.896
ORGLVL SEX	.856	3	.285	.179	.911
ORGLVL RACE	1.664	3	.555	.343	.790
SEX RACE	1.462	1	1.462	.919	.338
3-Way Interactions	12.611	3	6.305	3.962	.019
ORGLVL SEX RACE	12.611	3	6.305	3.962	.019*
Explained	148.658	15	10.618	5.673	.001
Residual	2083.012	1308	1.591		
Total	2231.670	1323	1.687		

ETA^2 / R^2} values are meaningless due to significant interaction effect

*statistically significant ($p \leq .05$)

Nonsignificant effects are plotted in Appendix E.

Main Effects. The observed F-ratio for organizational level, F = 24.734, was greater than the critical value, $F_{.95}(3, 1308) = 2.63$; therefore, the null hypothesis of "no effect" was rejected. In the presence of a significant three-way interaction, the normal procedure would have been to calculate the simple effects, determine those that were significant, then perform the Newman-Keuls tests. However, as stated earlier in this chapter, the small individual cell sizes preclude making meaningful inferences from the simple effects; therefore, they were not calculated.[22] The Newman-Keuls test on organizational levels indicated that level 2, the highest mean, was different from levels 6 and 7, but not level 5. Level 7, the lowest mean was different from all other levels. Finally, there was no significant difference between levels 5 and 6. These relationships are summarized in Table 4-8, part (iv), and plotted in Figure 4-5. The results for organizational level support similar findings by Gorman and Mallory (1972), Payne and Mansfield (1973), and Hendrix and Halverson (1980) that people higher in the organization tend to have more positive views about the organization.

The F-ratio for sex, F = 8.79, was greater than the critical value, $F_{.95}(1, 1308) = 3.86$; therefore, the null hypothesis was rejected. Newman-Keuls was not performed on

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[22]To be consistent, the Newman-Keuls test was performed on the main effect; however, it should be emphasized that due to the interaction effect, inferences made with respect to main effects must be interpreted with caution.

TABLE 4-8

Organizational Climate, Newman-Keuls Test on Main Effects (ORGLVL)

Section	ORGLVL		7	6	5	2
(i)		Mean	4.50	4.94	5.13	5.49
	7	4.50	--	.44	.63	.99
	6	4.94		--	.19	.55
	5	5.13			--	.36
	2	5.49				--
(ii)				r=2	r=3	r=4
		q.95(r,1308)		2.79	3.35	3.68
(iii)	$\sqrt{MSE/\tilde{n}}$	q.95(r,1308)		.307	.368	.404
(iv)	ORGLVL		7	6	5	2
	7			*	*	*
	6					*
	5					
	2					
	*p = .05					

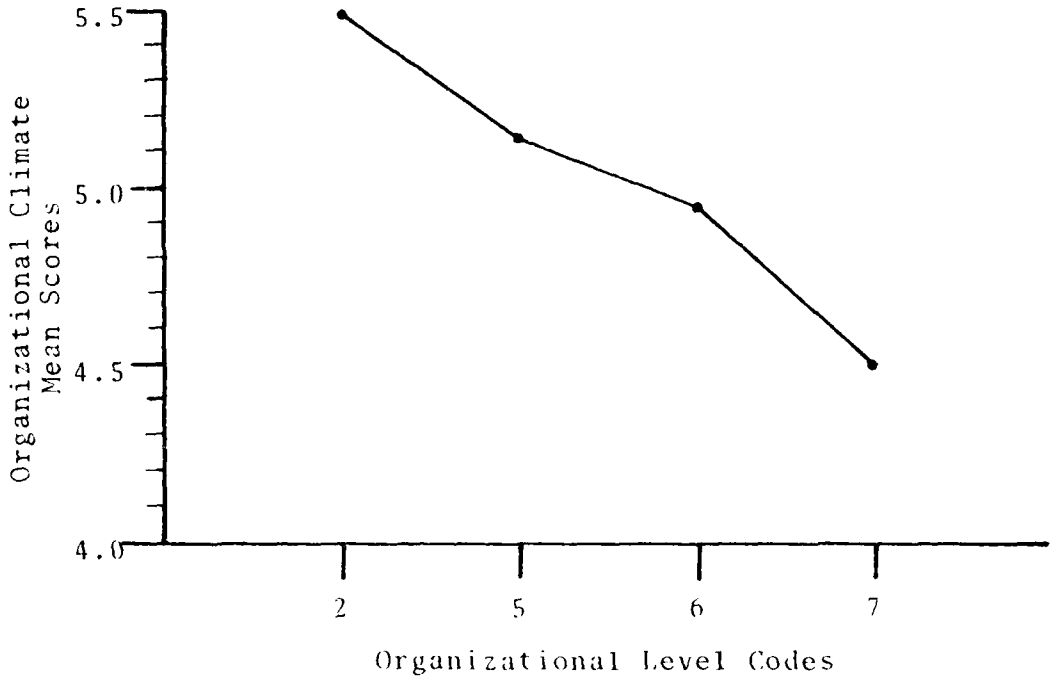
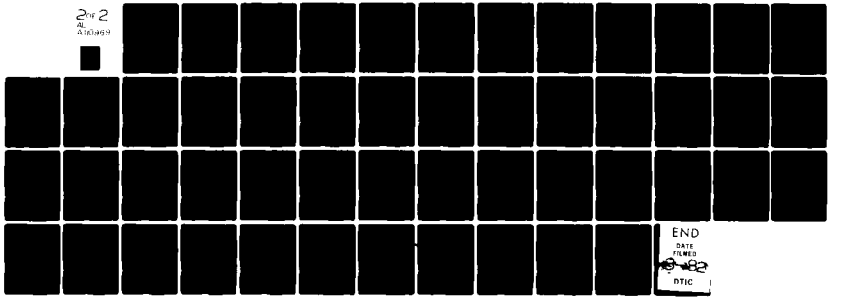


Figure 4-5

Organizational Climate By Organizational Level

AD-A110 969 AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OH SCHOOL--ETC F/G 5/9
THE EFFECTS OF ORGANIZATIONAL LEVEL, SEX, AND RACE ON AIR FORCE--ETC(U)
SEP 81 M J LYGA
UNCLASSIFIED AFIT-LSSR-80-81 NL



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the main effect for sex due to the dichotomous factor levels. The higher male mean was plotted against the female mean in Figure 4-6.

The main effect for race was not significant (Black = 4.63; White = 4.70).

Two-way Interactions. There were no significant two-way interactions for organizational climate. Based on the main effects, the plot of organizational level by sex was predictable--generally, upward and "parallel" plots resulted as organizational level increased, with male means being consistently higher than female means. Organizational level by race indicated little difference in the direction and magnitude of black and white mean scores for levels 7 and 6. However, for levels 5 and 2 the white plot continues upward where the black mean declines. Again this apparent interaction was not significant due to the relative small black cell size at level 2 (i.e., n = 1). The plot of race by sex indicated the males of both sexes had higher mean scores than the females with the difference being slightly greater for blacks than whites. Once again, due to the significant three-way interaction, these results should be interpreted with caution.

Three-way Interaction. The observed F-ratio for the three-way interaction, F = 3.962, was greater than the critical value $F_{.95}(3, 1308) = 2.63$. Because of the three-way interaction, it can be concluded that the effects of sex and race varied across organizational levels. The significant interaction also implied that the effect of organizational

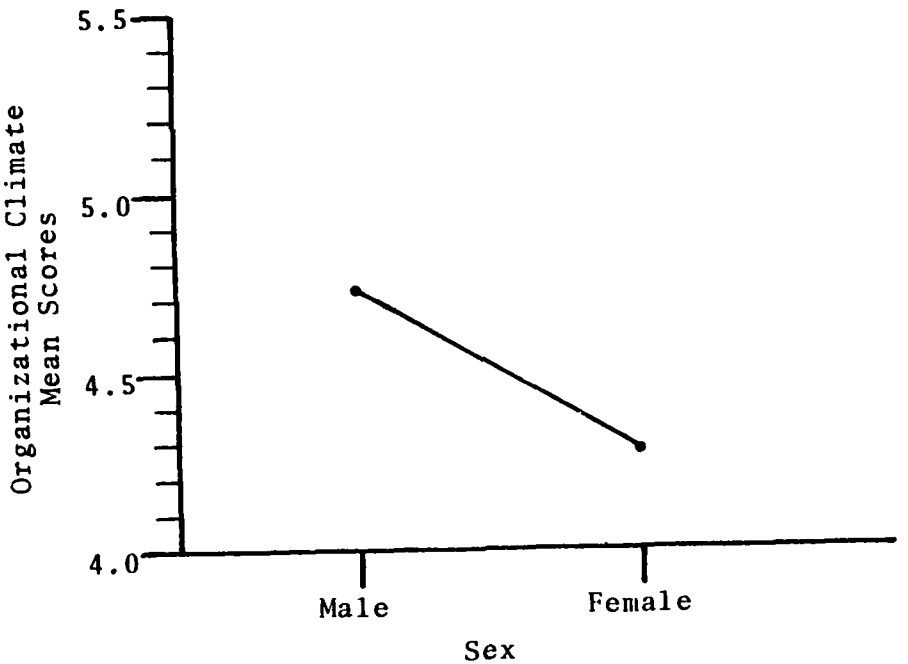


Figure 4-6

Organizational Climate By Sex

level was not uniform across the different factor levels for sex and race. This interaction is readily apparent in Figure 4-7, where the direction and magnitude of the race-sex plot for black-females differs considerably across organizational levels. The downward slope for blacks at the higher organizational levels is consistent with the results for job satisfaction and perceived productivity. However, what distinguishes this interaction, and probably accounts for the significance despite the small cell sizes, is the drastically lower female-black mean at organizational level 7. Unfortunately, the extremely small cell sizes make meaningful inferences about the parent population impossible.

Summary

A summary of the significant effects for the three criterion variables is presented in Table 4-9.

TABLE 4-9
Summary of Three-Way ANOVAs

Source of Variation	Criteria		
	Job Satisfaction	Perceived Productivity	Organ. Climate
Main Effects			
Organizational Level	*	*	*
Sex	*		*
Race		*	
Two-way Interactions			
Organizational Level by sex			
Organizational Level by race			
Sex by Race			
Three-way Interaction			
Organizational Level by Sex and Race			*

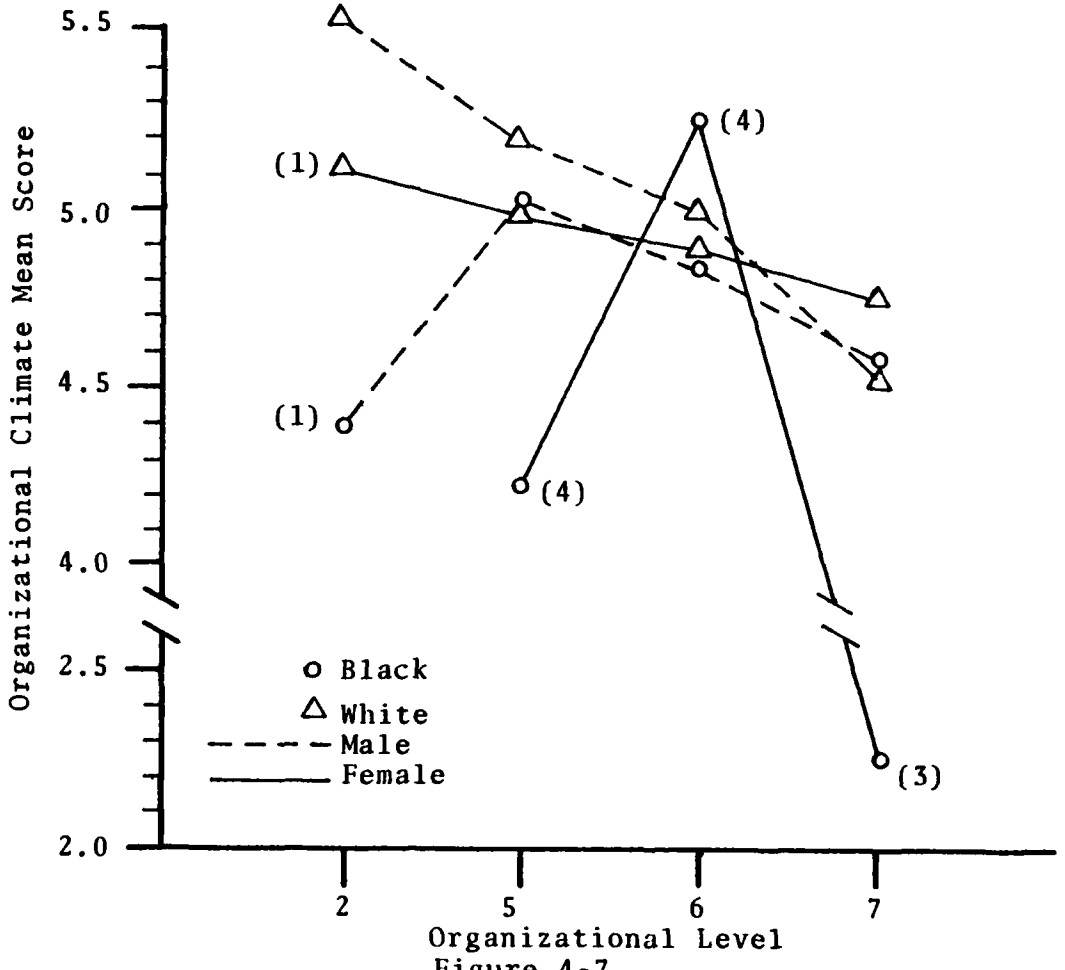


Figure 4-7
Organizational Climate By Organizational Level, Sex, and Race

NOTE: At ORGLVL 2 there were no Black female observations

CHAPTER 5

SUMMARY, CONCLUSION, RECOMMENDATION

Summary

Purpose

The purpose of this research was to determine if within the Air Force the situational variables--organizational level, sex, and race, either individually or interactively, have a significant effect on organizational effectiveness.

Research Question

The approach to the study began with a research question which examined the contingency relationship between two basic components of the Three Component Organizational Effectiveness Model (i.e., 1. Situational Environment; 2. Criteria). The question the research attempted to answer was:

> Do supervisors of different sex and race groups differ on the three criteria of organizational effectiveness (job satisfaction, perceived productivity, and organizational climate) at different organizational levels?

Research Sample

Establishing a research sample to specifically address the research question required tailoring an LMDC-provided, OAP (Version 3) data base. As a result of the

modifications, the research sample for this study was restricted to Air Force military supervisors of both sexes, who were either black or white (n = 1324).

Hypothesis Testing

The effects of the three situational variables on organizational effectiveness were analyzed by performing three, three-way ANOVAs, one for each criterion variable of organizational effectiveness. Seven hypotheses were tested in each ANOVA.

1. Organizational level does not affect organizational effectiveness,
2. Sex does not affect organizational effectiveness,
3. Race does not affect organizational effectiveness,
4. The interaction between organizational level and sex does not affect organizational effectiveness,
5. The interaction between organizational level and race does not affect organizational effectiveness,
6. The interaction between sex and race does not affect organizational effectiveness.
7. The interaction between organizational level, sex, and race does not affect organizational effectiveness.

Conclusion

Results

The study produced evidence that organizational level, sex, and race, individually, do have significant effects on the measures of organizational effectiveness for Air Force

supervisors. For all three criteria of effectiveness, the higher organizational levels had significantly higher effectiveness mean scores than the lower organizational levels. With respect to sex, male mean effectiveness scores were higher than female scores for all three effectiveness criteria, although the difference was significant only for job satisfaction and organizational climate. In terms of race, while the white mean effectiveness scores were higher than black means for all three criteria, only for perceived productivity was it significantly higher.

The research indicated that there was only one significant interaction effect--the three-way interaction between organizational level, sex, and race for organizational climate. This interaction would either indicate that the effects of sex and race differ across organizational levels for organizational climate, or that the effect of organizational level was not uniform across different factor levels of sex and race. The point is moot, however, because extremely small sex-race cell sizes at various organizational levels made analysis of simple effects and inferences about the parent population meaningless. The problem with small cell-sizes was evident in other interaction analyses where plots of cell means resulted in "classic interaction effects" which were not statistically significant due to the small cell size. Because of this and another limitation described later, the results of the study are considered inconclusive until a more robust sample has been examined.

Limitations

Two limitations were encountered in the study which seriously restrict the conclusions drawn from this research.

The first limitation was the result of a basic assumption about the research sample which turned out to be incorrect. In Chapter 1, a basic research assumption was that the LMDC-provided data base (n = 4786) was a representative cross-section of the Air Force population. However, when establishing the research sample for this study, four of the eight organizational levels (Headquarters USAF, Numbered Air Force, Air Division, and Specialized Activities) had to be eliminated from further analysis due to insufficient data. The obvious limitation imposed by eliminating four organizational levels is that the analyses do not address the full spectrum of Air Force hierarchical structure.

The second limitation, also related to the research sample, was rooted in the small minority cell sizes. Modifying the LMDC-provided data base to specifically address the research question of this study resulted in a sample composed of Air Force military supervisors of both sexes who were either black or white (n = 1324). However, when this sample was partitioned by organizational level, sex, and race, the joint frequency distributions of several cells were too small for meaningful analysis.

Recommendation

The results of this research were inconclusive due

to the limitations imposed by the research sample; however, the need to determine the effects of this set of situational variables on Air Force organizational effectiveness still exists. It is recommended, therefore, that additional research be conducted on this same objective with a robust and representative research sample to overcome the limitations identified in this study.

APPENDIX A

ORGANIZATIONAL EFFECTIVENESS CRITERIA

A Partial Listing of Univariate Measures of Organizational Effectiveness

overall effectiveness

quality

productivity

readiness

efficiency

profit or return

growth

utilization of environment

stability

turnover or retention

absenteeism

accidents

morale

motivation

satisfaction

internalization of organizational goals

conflict--cohesion

flexibility--adaptation

evaluations by external entities

Source: Richard M. Steers, Organization Effectiveness: A Behavioral View. Santa Monica CA: Goodyear Publishing Company, Inc., 1977, pp. 40-41. Originally from an unpublished manuscript by J.P. Campbell in 1973.

Evaluation Criteria in Multivariate Models of Organizational Effectiveness

Study	Type Measure*	Generalizability**	Derivation***	Criteria
Georgopoulos and Tannenbaum (1957)	N	A	DED	Productivity, Flexibility, Absence of Organizational Strain
Bennis (1962)	N	A	DED	Adaptability, Sense of Identity, Capacity to Test Reality
Blake and Mouton (1964)	N	B	DED	Simultaneous Achievement of High Production-Centered and High People-Centered Enterprise
Caplow (1964)	N	A	DED	Stability, Integration, Voluntarism, Achievement
Katz and Kahn (1966)	N	A	IND	Growth, Storage, Survival, Control over Environment
Lawrence and Lorsch (1967)	D	B	IND	Optimal Balance of Integration and Differentiation
Yuchtman and Seashore (1967)	N	A	IND	Successful Acquisition of Scarce and Valued Resources, Control Over Environment
Frielander and Pickle (1968)	N	B	IND	Profitability, Employee Satisfaction, Societal Value

Study	Type Measure*	Generalizability**	Derivation***	Criteria
Price (1968)	D	A	IND	Productivity, Conformity, Morale, Adaptiveness, Institutionalization
Mahoney and Weitzel (1969)	D	B	IND	General Business Model: Productivity-support-utilization, Planning, Reliability, Initiative Rand D Model: Reliability Cooperation, Development
Schein (1970)	N	A	DED	Open Communication, Flexibility, Creativity, Psychological Commitment
Mott (1972)	N	A	DED	Productivity, Flexibility, Adaptability
Duncan (1973)	N	A	DED	Goal Attainment, Integration, Adaptation
Gibson et al. (1973)	N	A	IND	Short-run: Production, Efficiency, Satisfaction Intermediate: Adaptiveness, Development Long-run: Survival
Negandhi and Reimann (1973)	N	B	DED	Behavioral Index: Manpower Acquisition, Employee Satisfaction, Manpower Retention, Interpersonal Relations Interdepartmental Relations, Manpower Utilization Economic Index: Growth in Sales, Net Profit

Study	Type Measure*	Generalizability**	Derivation***	Criteria
Child (1974, 1975)	N	B	DED	Profitability, Growth
Webb (1974)	D	C	IND	Cohesion, Efficiency, Adaptability, Support

*N = Normative
D = Descriptive

**A = All Organizations
B = Business Organizations
C = Religious Organizations

***DED = Deductive
IND = Inductive

Source: Steers, R.M., "Problems in Measurement of Organizational Effectiveness," Administrative Science Quarterly, Vol. 20 (1975), pp. 546-68.

APPENDIX B

ORGANIZATIONAL ASSESSMENT PACKAGE
(VERSION 3)

ORGANIZATIONAL ASSESSMENT PACKAGE (VERSION 3)

The Organizational Assessment Package (OAP) is a series of surveys for collecting information about you, your job, your work group, your supervisor, and your organization.

The terms **work group**, organization, and **supervisor** are used throughout the OAP and need some clarification. The term **work group** refers to a group of individuals working for the same supervisor, while the term **organization** refers to the overall organizational unit. For example, if your position is within a section of a squadron then the squadron would be your organization and your section would be your work group.

With the exception of the Background Information Section, two types of scales are used in the OAP. Most surveys will have a seven point (1 – 7) scale; however, three inventories will include a zero point (0 – 7) which should be marked if an item is non-applicable. Mark your answers on the separate answer sheet provided. **Please use a number 2 pencil only.** Make heavy black marks that fill the oval-shaped space. For example, using the scale below, if you **moderately agree** with item statement 1 then you would blacken oval number 6 on the answer sheet as shown in the example below.

Scale:

0 = Not applicable
1 = Strongly disagree
2 = Moderately disagree
3 = Slightly disagree
4 = Neither agree nor disagree
5 = Slightly agree
6 = Moderately agree
7 = Strongly agree

Item Statement

1. The information your work group receives from other work groups is helpful.

Answer Response:

( ) 001 (1) (2) (3) (4) (5) ● (7)

Should the above statement not be applicable for you then you would mark the unnumbered oval as shown below.

Answer Response:

● 002 (1) (2) (3) (4) (5) (6) (7)

It is important that you answer **all** items honestly. Only in this way can an accurate description of your organization be obtained.

Summary results only describing your organization will be provided to your organization. In turn, your organization will have the opportunity to present the results to you and discuss them. Your individual responses are confidential, and will not be provided to your organization or any other agency. Only those individuals performing this research will have access to your completed OAP.

DO NOT STAPLE OR OTHERWISE DAMAGE THE ANSWER SHEET.

PRIVACY ACT STATEMENT

1. Authority: 10 USC 8012, Secretary of the Air Force: Powers, Duties, Delegation by Compensation E.O. 9397, 22 Nov 43, Numbering System for Federal Accounts Relating to Individual Persons.

2. PRINCIPAL PURPOSE(S): This information will be used for Air Force research and development purposes and for organizational problem area identification.

3. ROUTINE USES: Information provided by respondents will be treated confidentially and will be used for official research purposes and organizational problem area identification. Information obtain will also be used to improve instruments and techniques for organizational assessment.

4. WHETHER DISCLOSURE IS MANDATORY OR VOLUNTARY AND EFFECT ON INDIVIDUAL OF NOT PROVIDING INFORMATION: Disclosure of this information is voluntary. The Air Force continues to improve only with your assistance to make additional refinements in management of its resources. Your cooperation in this effort is appreciated.

BACKGROUND INFORMATION

Instructions

The first section of this survey concerns your background. Please use the separate answer sheet and darken the oval which corresponds to your response to each question.

1. You are an:

(901)* 1. Officer
(902) 2. Airman
(903) 3. Civilian (GS)
(904) 4. Civilian (Wage Employee)
(905) 5. Non-Appropriated Fund (NAF) Employee
(906) 6. Others

2. Your grade level is:

(907) 1. 1–3
(908) 2. 4–5
(909) 3. 6–7
(910) 4. 8–9
(911) 5. 10–12
(912) 6. 13–15
(913) 7. 16 or Higher

3. Total months in this organization is:

(914) 1. Less than 1 month.
(915) 2. More than 1 month, less than 6 months.
(916) 3. More than 6 months, less than 12 months.
(917) 4. More than 12 months, less than 18 months.
(918) 5. More than 18 months, less than 24 months.
(919) 6. More than 24 months, less than 36 months.
(920) 7. More than 36 months.

*Number in parenthesis is for machine readable data reference only.

4. Total months experience in present job is

(921) 1. Less than 1 month
(922) 2. More than 1 month, less than 6 months
(923) 3. More than 6 months, less than 12 months.
(924) 4. More than 12 months less than 18 months
(925) 5. More than 18 months, less than 24 months.
(926) 6. More than 24 months, less than 36 months
(927) 7. More than 36 months.

5. Your race is:

(928) 1. American Indian or Alaskan Native
(929) 2. Asian or Pacific Islander
(930) 3. Black, not of Hispanic Origin
(931) 4. Hispanic
(932) 5. White, not of Hispanic Origin
(933) 6. Other

6. Your sex is:

(934) 1. Male
(935) 2. Female

7. Your highest educational level obtained was:

(936) 1. Non high school graduate
(937) 2. High School graduate or GED
(938) 3. Some college work
(939) 4. Backelor's degree
(940) 5. Some graduate work
(941) 6. Master's degree
(942) 7. Doctoral degree

8. Highest level of professional military education (residence or correspondence):

(943) 0. None or not applicable
(944) 1. NCO Orientation Course or USAF Supervisor Course (NCO Phase 1 or 2)
(945) 2. NCO Leadership School (NCO Phase 3)
(946) 3. NCO Academy (Phase 4)
(947) 4. Senior NGO Academy (Phase 5)
(948) 5. Squadron Officer School
(949) 6. Intermediate Service School (Officer)
(950) 7. Senior Service School (Officer) (i.e., Air War College)

9. How many people do you directly supervise (i.e., those you write performance reports for)

(951) 1. None
(952) 2. 1 to 2
(953) 3. 3 to 5
(954) 4. 6 to 8
(955) 5. 9 to 12
(956) 6. 13 to 20
(957) 7. 21 or more

10. Does your supervisor actually write your performance report?

(958) 1. Yes
(959) 2. No

11. Your work requires you to work primarily

(960) 1. Alone
(961) 2. With one or two people
(962) 3. As a small group team member
(963) 4. As a large group team member (6 or more people)
(964) 5. Other

12. How stable are your work hours?

(965) 1. Highly Stable – Routine 8 hours a day
(966) 2. Very Stable - Nearly routine 8 hour day
(967) 3. Moderately Stable - Shift work which periodically changes
(968) 4. Slightly Unstable - Irregular working hours
(969) 5. Highly Unstable - Frequent TDYs, frequently on call

13. Your job requires how much communication between workers?

(970) 1. Very little
(971) 2. Little
(972) 3. Moderate
(973) 4. Very frequent
(974) 5. Almost continuous

14 To what extent in your work group are group meetings used to solve problems and establish goals and objectives?

(975) 1. None
(976) 2. Occasionally
(977) 3. About half the time
(978) 4. Almost totally

15. Your work schedule is basically:

(979) 1. Shift work, usually days.
(980) 2. Shift work, usually swing shift.
(981) 3. Shift work, usually nights.
(982) 4. Shift work, usually days and nights.
(983) 5. Daily work only.
(984) 6. Crew schedule.
(985) 7. Other.

16. Which of the following best describes your career intentions?

(986) 1. To continue in the Air Force.
(987) 2. Will most likely continue in the Air Force.
(988) 3. May continue in the Air Force.
(989) 4. Planning to retire in the next 12 months.
(990) 5. Other

JOB INVENTORY

Instructions

Below are items which relate to your job. Read each statement carefully and then decide to what extent the statement is true of your job. Indicate the extent that the statement is true for your job by choosing the statement below which best represents your job.

1 = Not at all
2 = To a very little extent
3 = To a little extent
4 = To a moderate extent
5 = To a fairly large extent
6 = To a great extent
7 = To a very great extent

Select the corresponding number for each question and enter it on the separate answer sheet.

PART I: THE JOB ITSELF

(201) 17. To what extent does your job require you to do many different things, using a variety of your talents and skills?

(202) 18. To what extent does your job involve doing a **whole** task or unit of work?

(203) 19. To what extent is your job significant, in that it affects others in some important way?

(204) 20. To what extent does your job provide an great deal of freedom and independence in scheduling your work and selecting your own procedures to accomplish it?

(205) 21. To what extent does just doing your job provide you with chances to find out how well you are doing?

(206) 22. To what extent do **additional duties** interfere with the performance of your primary job?

(207) 23. To what extent do you have adequate tools and equipment to accomplish your job?

(208) 24. To what extent is the amount of work space provided adequate?

(209) 25. To what extent does your job provide the chance to know for yourself when you do a good job; and to be responsible for your own work?

(210) 26. To what extent does doing your job well affect a lot of people?

(211) 27. To what extent does your job provide you with the chance to finish completely the piece of work you have begun?

(212) 28. To what extent does your job require you to use a number of complex skills?

(213) 29. To what extent does your job give you freedom to do your work as you see fit?

(214) 30. To what extent are you allowed to make the major decisions required to perform your job well?

(215) 31. To what extent are you proud of your job?

(216) 32. To what extent do you feel accountable to your supervisor in accomplishing your job?

(217) 33. To what extent do you know exactly what is expected of you in performing your job?

(218) 34. To what extent are your job performance goals difficult to accomplish?

(219) 35. To what extent are staff assistance visits helpful in achieving job performance?

(220) 36. To what extent are your job performance goals clear and specific?

(221) 37. To what extent are your job performance goals realistic?

1 - Not at all
2 - To a very little extent
3 - To a little extent
4 - To a moderate extent
5 - To a fairly large extent
6 = To a great extent
7 = To a very great extent

(222)	38	To what extent do you use Management Information Systems(e.g., Computer Printouts, reports, etc.) to make decisions in your job?
(223)	39	How much of your time is used for planning more than 6 months ahead?
(224)	40	How much of your time is used for weekly or monthly planning?
(225)	41	How much of your time is used for daily planning?
(226)	42.	To what extent do you perform the same tasks repeatedly within a short period of time?
(227)	43	To what extent are you faced with the same type of problem on a weekly basis?
(228)	44	To what extent are tasks you perform easy to accomplish?
(229)	45	To what extent is planning modified to meet changing job related needs? Changing environment?
(230)	46	To what extent does your job keep you busy?
(231)	47.	To what extent are the people affected by decisions asked for their ideas?
(232)	48.	To what extent is the amount of information you get from other work groups adequate to meet your job needs?
(233)	49.	To what extent do you know what the objectives of your organization are?
(234)	50	To what extent are you aware of promotion/advancement opportunities that affect you?
(235)	51.	To what extent is your work group involved in establishing goals?
(236)	52.	To what extent does your work group solve problems effectively?
(237)	53.	To what extent does your work group perform effectively under pressure?
(238)	54	To what extent do coworkers in your work group maintain high standards of performance?
(239)	55.	To what extent do you have the opportunity to progress up your career ladder?
(240)	56.	To what extent are you being prepared to accept increased responsibility?
(241)	57.	To what extent do people who perform well receive recognition?
(242)	58.	To what extent do you feel adequately trained to perform your assigned tasks?
(243)	59	To what extent are you satisfied with your job?
(244)	60.	To what extent does your work give you pride and feeling of self-worth?
(245)	61.	To what extent does your supervisor provide the assistance you need to manage your work?
(246)	62.	My supervisor asks for ideas before making decisions.
(247)	63	To what extent does your supervisor encourage the people in your work group to work as a team?
(248)	64.	To what extent does your supervisor allow you to make decisions concerning your job?

Instructions

Below are statements which deal with job characteristics. Some of these may not be in your job now. However, read each statement below and choose the answer which best represents how much you would like to have each characteristic in your job.

In my job, I would like to have the characteristics described:

1 = A slight amount
2 = An average amount
3 = A moderate amount
4 = A fairly large amount
5 = A large amount
6 = A very large amount
7 = An extremely large amount

(249) 65. Opportunities to have independence in my work.

(250) 66. A job that is meaningful.

(251) 67. The availability for personal growth in my job.

(252) 68. Opportunities in my work to use my skills.

(253) 69. Opportunities to perform a variety of tasks.

(254) 70. Opportunities in my work to learn new and exciting things.

(255) 71. A job in which tasks are repetitive.

(256) 72. Opportunities to keep busy in my work.

(257) 73. The opportunity to perform all tasks or jobs in my career field from time to time.

(258) 74. A job in which tasks are relatively easy to accomplish.

PERCEIVED PRODUCTIVITY

Instructions

The statements below deal with the output of your work group. For some jobs certain statements may not be applicable. Should this be the case for your work group, then you should select the **not applicable** statement coded "0" below. Indicate your agreement with the statement by selecting the answer which best represents your attitude concerning your work group.

0 = Not applicable
1 = Strongly disagree
2 = Moderately disagree
3 = Slightly disagree
4 = Neither agree nor disagree
5 = Slightly agree
6 = Moderately agree
7 = Strongly agree

(259) 75. The **quantity** of output of your work group is very high.

(260) 76. The **quality** of output of your work group is very high.

(261) 77 When high priority work arises, such as short suspenses, crash programs, and schedule changes, the people in my work group do an **outstanding** job in handling these situations.

(262) 78. There is a bottleneck in my organization that seriously affects the flow of work either to or from my work group.

(263) 79. Your work group is frequently involved in crash programs, short suspenses, schedule changes, etc.

0 = Not applicable
1 = Strongly disagree
2 = Moderately disagree
3 = Slightly disagree
4 = Neither agree nor disagree
5 = Slightly agree
6 = Moderately agree
7 = Strongly agree

(264) 80. Your work group always gets maximum output from available resources (e.g., personnel and material).

(265) 81. Your work group's performance in comparison to similar work groups is very high.

SUPERVISOR INVENTORY

Instructions

The statements below describe characteristics of managers or supervisors. Indicate your agreement by choosing the statement below which best represents your attitude concerning your supervisor.

0 = Not applicable
1 = Strongly disagree
2 = Moderately disagree
3 = Slightly disagree
4 = Neither agree nor disagree
5 = Slightly agree
6 = Moderately agree
7 = Strongly agree

Select the corresponding number and mark your answer on the separate answer sheet.

(403) 82. My supervisor tells me exactly what he expects me to do.

(404) 83. My supervisor is a good planner.

(405) 84. My supervisor sets high performance standards.

(406) 85. My supervisor's group meetings are well planned with specific objectives.

(407) 86. My supervisor encourages goal setting within our group.

(408) 87. My supervisor informs me of changes in advance.

(409) 88. My supervisor is consistent in predicting events in our organization.

(410) 89. My supervisor encourages teamwork.

(411) 90. My supervisor represents the group at all times.

(412) 91. My supervisor establishes good work procedures.

(413) 92. My supervisor has made his responsibilities clear to the group.

(414) 93. My supervisor fully explains procedures to each group member when appropriate.

(415) 94. My supervisor's directions must be followed exactly.

(416) 95. My supervisor performs well under pressure.

(417) 96. My supervisor usually makes decisions without group discussion.

(418) 97. My supervisor encourages me toward greater accomplishment.

(419) 98. My supervisor overemphasizes the need to accomplish more than other groups.

(420) 99. My supervisor resolves conflicts within the group.

(421) 100. My supervisor over-controls my work.

0 = Not applicable
1 = Strongly disagree
2 = Moderately disagree
3 = Slightly disagree
4 = Neither agree nor disagree
5 = Slightly agree
6 = Moderately agree
7 = Strongly agree

(422) 101. My supervisor is approachable.
(423) 102. My supervisor tries to make the work more satisfying for group members.
(424) 103. My supervisor takes time to help me when needed.
(425) 104. My supervisor respects work group members' opinions in his decision making.
(426) 105. My supervisor asks members for their ideas on task improvements.
(427) 106. My supervisor is very interested in helping me resolve my problems.
(428) 107. My supervisor explains how my job contributes to the overall mission.
(429) 108. My supervisor helps to stimulate enthusiasm for the job.
(430) 109. My supervisor focuses on major goals.
(431) 110. My supervisor helps me set specific goals.
(432) 111. My supervisor is consistent in his managerial behavior.
(433) 112. My supervisor lets me know when I am doing a good job.
(434) 113. My supervisor lets me know when I am doing a poor job.
(435) 114. My supervisor always helps me improve my performance.
(436) 115. My supervisor insures that I get job related training when needed.
(437) 116. My job performance has improved due to feedback received from my supervisor.
(438) 117. My supervisor encourages ideas for improving procedures.
(439) 118. When I need technical advice I usually go to my supervisor.
(440) 119. My supervisor is an effective manager.
(441) 120. My supervisor keeps me informed of changes that affect my job.
(442) 121. My supervisor frequently gives me feedback on how well I am doing my job.
(443) 122. My supervisor usually supports my decisions.

ORGANIZATION CLIMATE INVENTORY

Instructions

Below are items which describe characteristics of your **organization.** Indicate your agreement by choosing the statement below which best represents your opinion concerning your organization.

1 = Strongly disagree
2 = Moderately disagree
3 = Slightly disagree
4 = Neither agree nor disagree
5 = Slightly agree
6 = Moderately agree
7 = Strongly agree

Select the corresponding number and enter it on the separate answer sheet.

(102) 123. Ideas developed by your work group are readily accepted by management personnel above your supervisor.

1 = Strongly disagree
2 = Moderately disagree
3 = Slightly disagree
4 = Neither agree nor disagree
5 = Slightly agree
6 = Moderately agree
7 = Strongly agree

(103) 124. Your organization provides all the necessary information for you to do your job effectively.

(104) 125. Your organization provides adequate and accurate information to your work group.

(105) 126. Our work unit is usually aware of important events and situations.

(106) 127. Your complaints are aired satisfactorily.

(107) 128. Your organization is very effective in planning the work to be accomplished

(108) 129. Your organization is better run now than in the past.

(109) 130. Your organization is very interested in the attitudes of the group members toward their jobs.

(110) 131. Your organization has a very strong interest in the welfare of its people.

(111) 132. I am very proud to work for this organization.

(112) 133. I feel responsible to my organization in accomplishing its mission.

(113) 134. The information in your organization is widely shared so that those needing it have available.

(114) 135. The people affected by decisions are asked for their ideas before the decisions are made.

(115) 136. Personnel in my unit are recognized for outstanding performance.

(116) 137. I am usually given the opportunity to present the results of my work to others.

(117) 138. There is a high spirit of teamwork that exists between co-workers.

(118) 139. There is outstanding cooperation between work groups of your organization.

(119) 140. My supervisor's boss is aware of the needs of my work group.

(120) 141. This organization has clear-cut, reasonable goals.

(121) 142. I feel motivated to contribute my best efforts to the mission of this organization.

(122) 143. This organization rewards individuals based on performance.

(123) 144. Rules and regulations of this organization help me to perform my job.

(124) 145. This organization insures that I have the necessary supplies to adequately accomplish my job.

JOB SATISFACTION QUESTIONNAIRE

Instructions

The items below relate to your job or the Air Force as a profession. Indicate how satisfied or dissatisfied you are with each item. Choose the statement below which best describes your degree of satisfaction or dissatisfaction.

0 = Not applicable	4 = Neither satisfied or dissatisfied
1 = Extremely dissatisfied	5 = Slightly satisfied
2 = Moderately dissatisfied	6 = Moderately satisfied
3 = Slightly dissatisfied	7 = Extremely satisfied

(704) 146. **Information on Policies and Procedures**
The adequacy and availability of information on policies, such as promotion or other organization policies.

(705) 147. **Feeling of Helpfulness**
The chance to help people and improve their welfare through the performance of your job. The importance of your job performance to the welfare of others.

(706) 148. **Control of Others (Non-Supervisory)**
The chance to tell others what to do. The control your job gives you over material.

(707) 149. **Characteristics of the Local Area**
The geographical area in which you work, weather in the local area, recreational opportunities available, and the size of the surrounding community.

(708) 150. **Social Contact**
Opportunity to meet new people, the amount and the meaningfulness of social contacts required by the job.

(709) 151. **Co-Worker Relationships**
Your amount of effort compared to the effort of your co-workers, the extent to which your co-workers share the load, and the spirit of teamwork which exists between your co-workers.

(710) 152. **Family Attitude Toward Job**
The recognition and the pride your family has in the work you do.

(711) 153. **On-the-Job Training (OJT)**
The OJT instructional methods and instructors' competence.

(712) 154. **Technical Training (Other then OJT)**
The technical training you have received to perform your current job.

(713) 155. **Moral Acceptability of Job**
The chance to do things not violating your sense of "right and wrong."

(714) 156. **Self-Improvement Opportunities**
The educational and recreational opportunities provided in the surrounding community, and the opportunity provided by the Air Force for self-improvement education.

(715) 157. **Verbal and Written Communication**
The amount of required telephone communication and required paperwork in your job.

(716) 158. **Work Itself**
The challenge, interest, importance, variety, and feelings of accomplishment you receive from your work.

0 = Not applicable
1 = Extremely dissatisfied
2 = Moderately dissatisfied
3 = Slightly dissatisfied
4 = Neither satisfied or dissatisfied
5 = Slightly satisfied
6 = Moderately satisfied
7 = Extremely satisfied

(717) 159. **Work Schedule**
Your work schedule; flexibility and regularity of your work schedule, the number of hours you work per week

(718) 160. **Job Security**

(719) 161. **Acquired Valuable Skills**
The chance to acquire valuable skills in your job which prepare you for future opportunities.

(720) 162. **Base Exchange Services**
At your base.

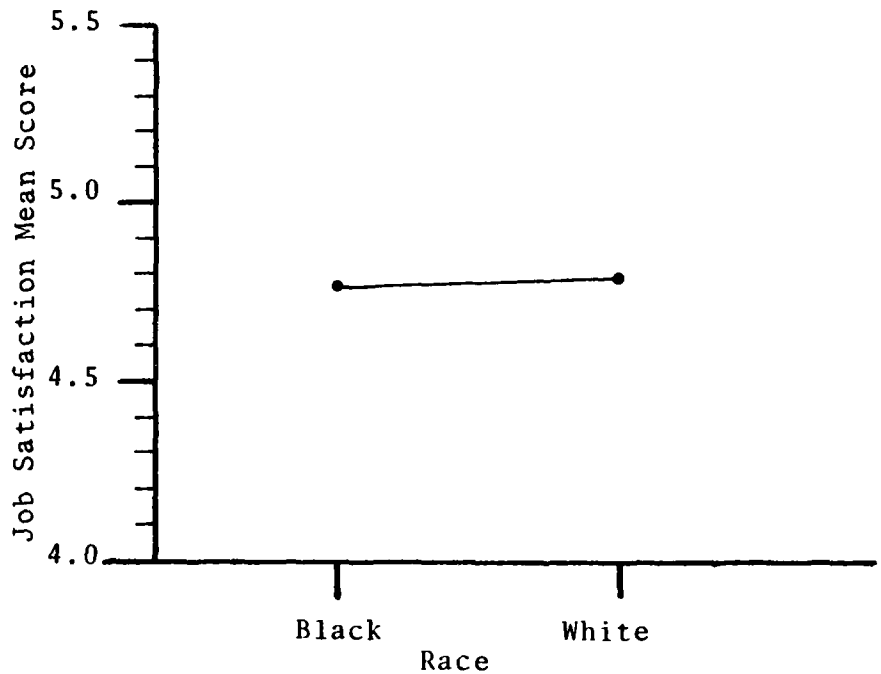
(721) 163. **Commissary**
At your base.

(722) 164. **Medical Facilities**
At your base.

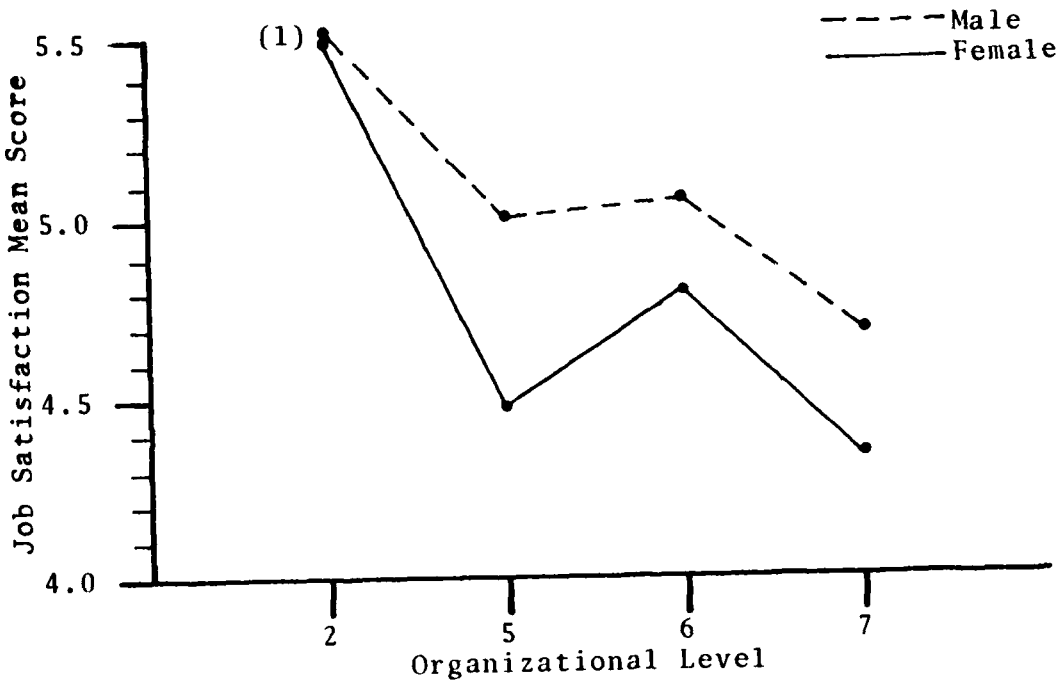
(723) 165. **Your Job as a Whole**

APPENDIX C

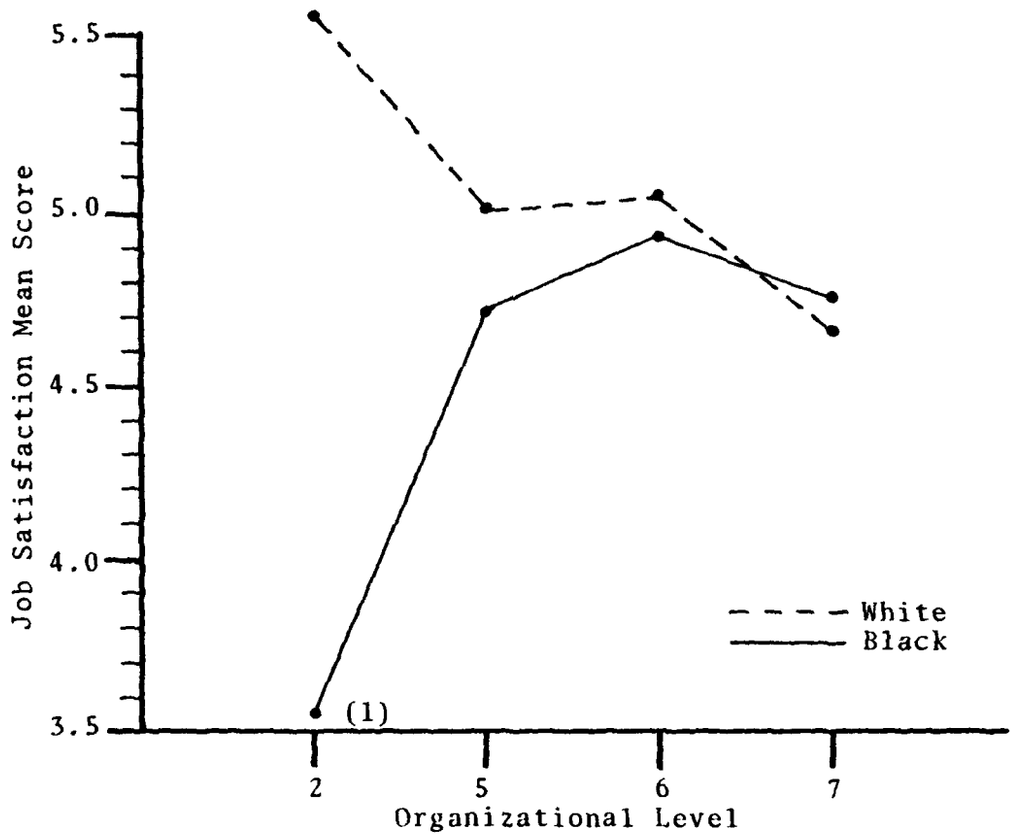
JOB SATISFACTION--PLOTS OF NONSIGNIFICANT EFFECTS



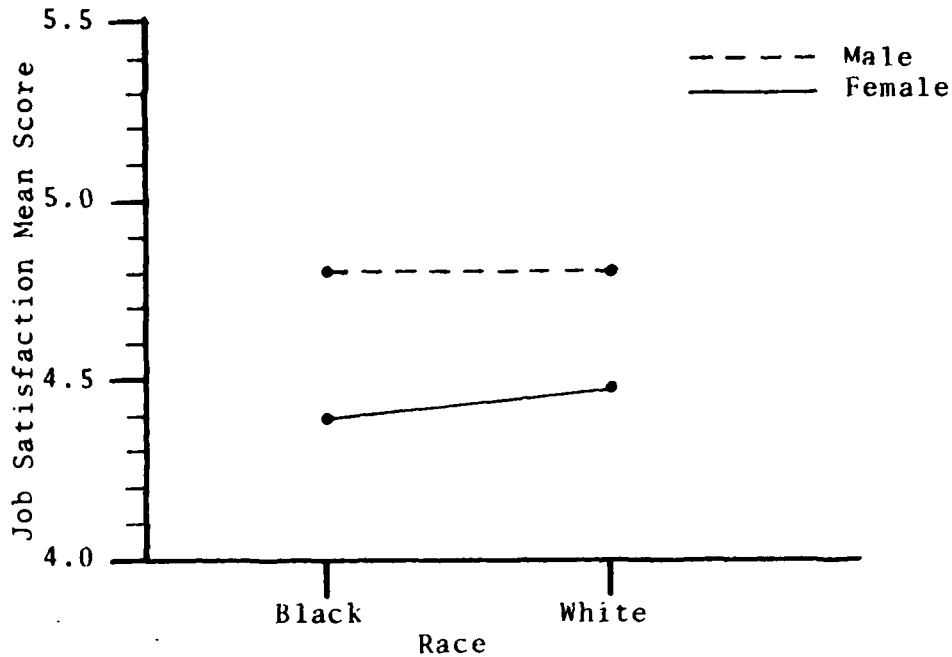
Job Satisfaction By Race



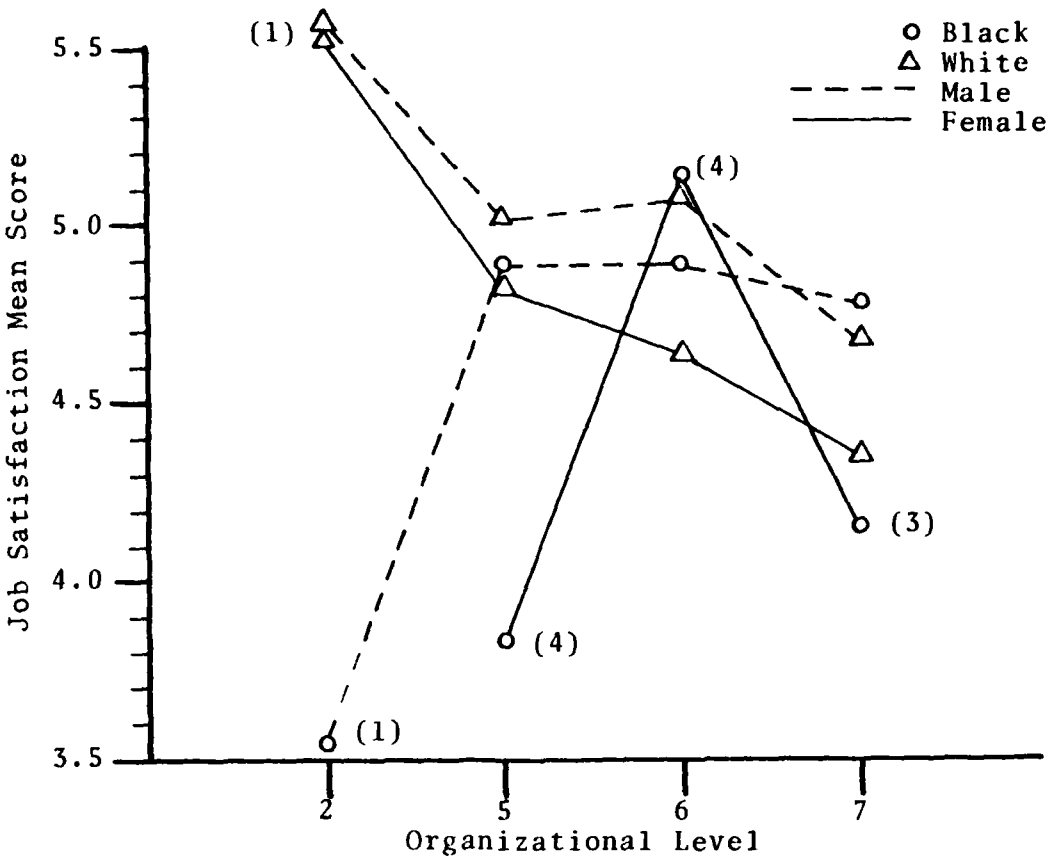
Job Satisfaction By Organizational Level and Sex



Job Satisfaction By Organizational Level and Race



Job Satisfaction By Sex and Race

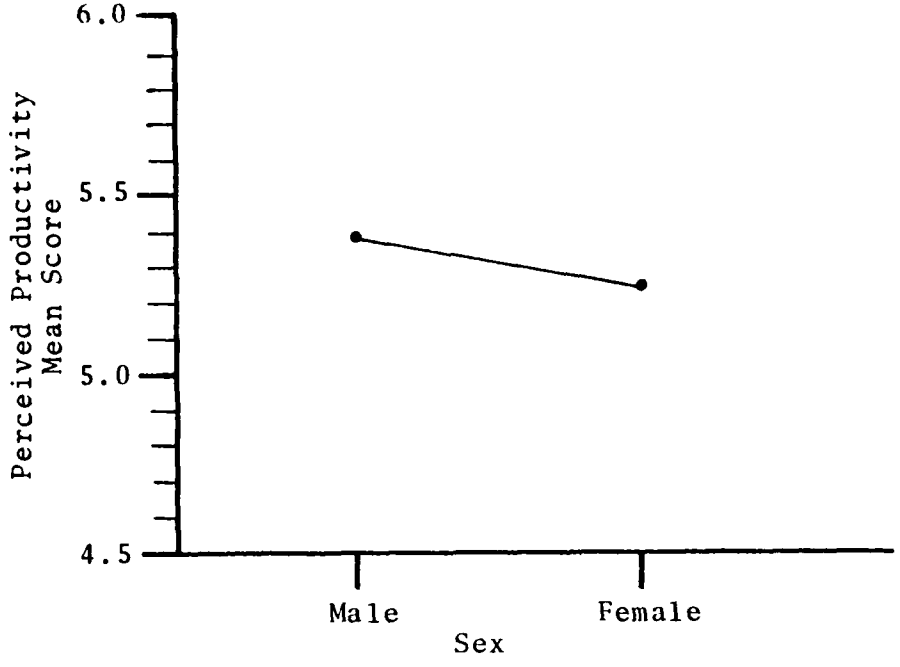


Job Satisfaction by Organizational Level, Sex, and Race

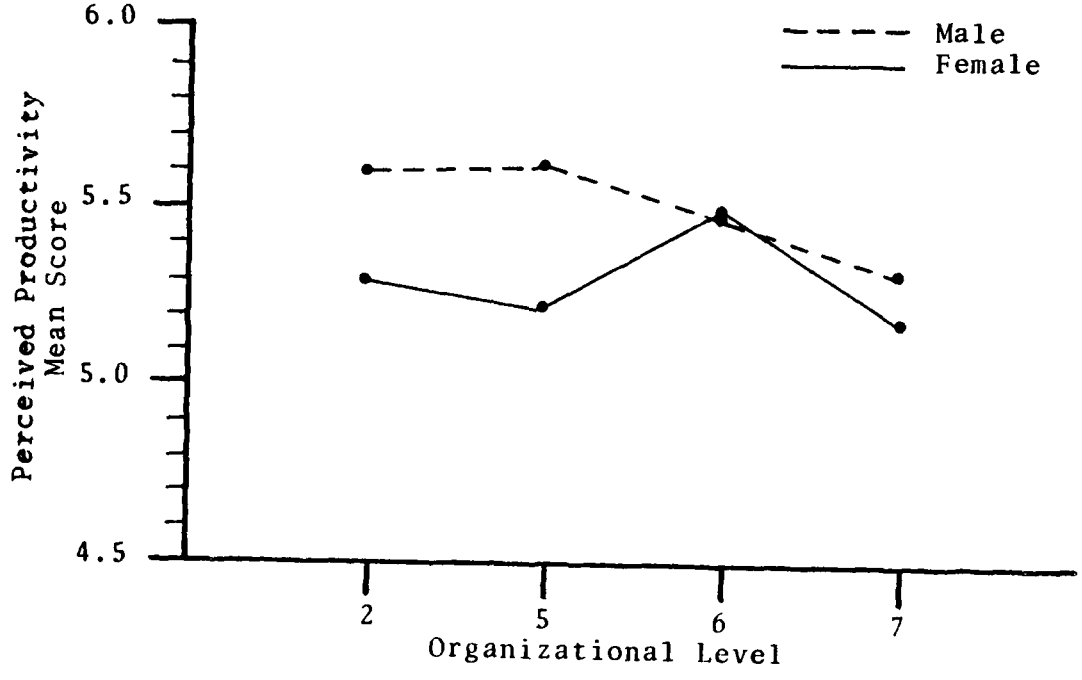
NOTE: At ORGLVL 2 there were no Black female observations

APPENDIX D

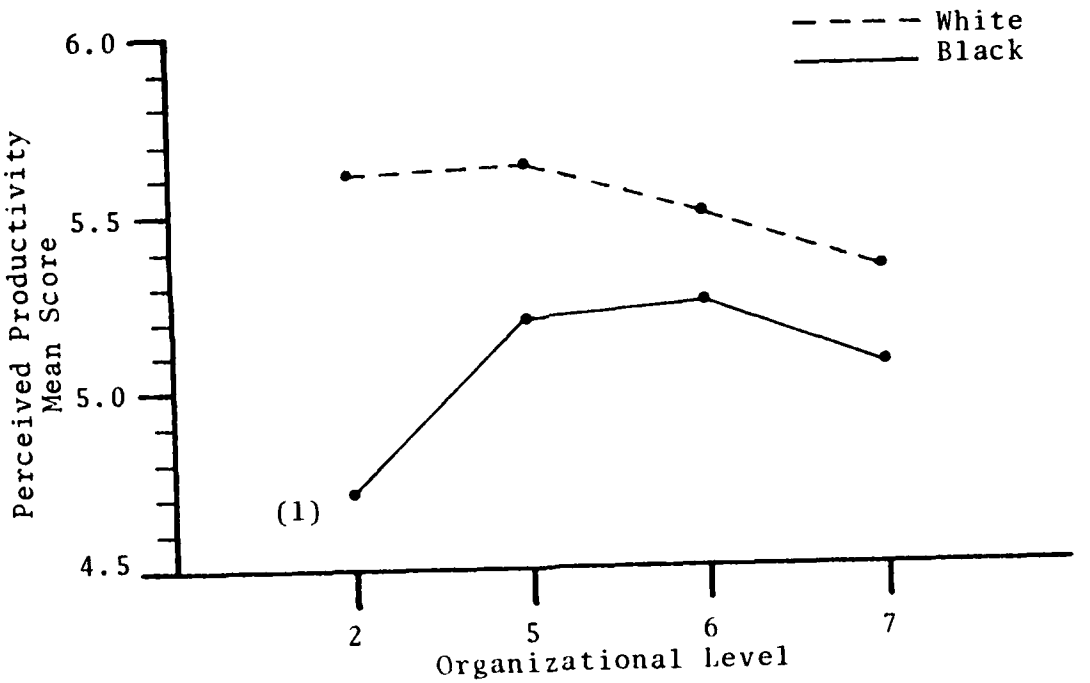
PERCEIVED PRODUCTIVITY--PLOTS OF NONSIGNIFICANT EFFECTS



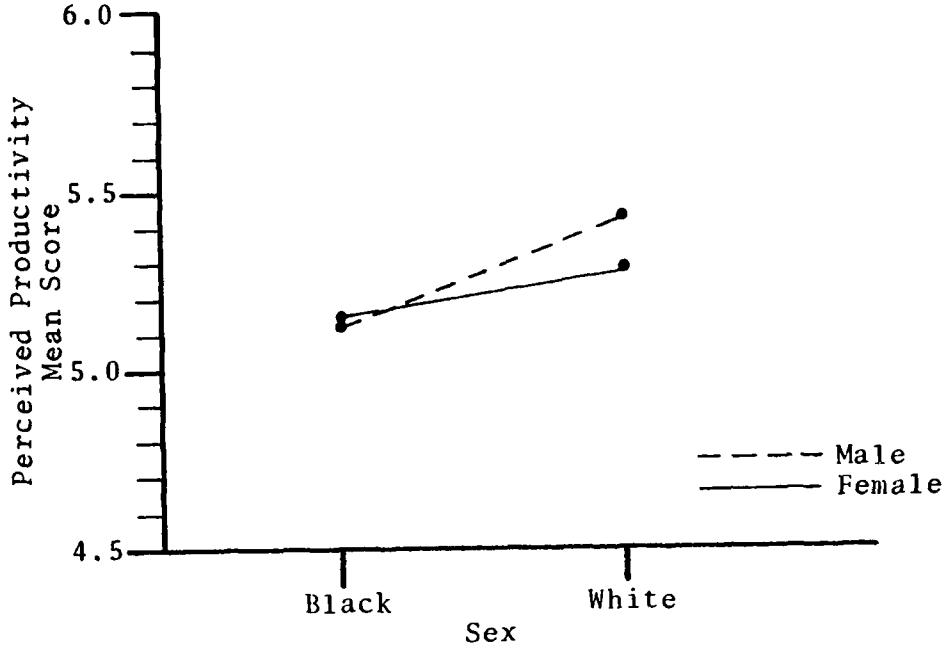
Perceived Productivity By Sex



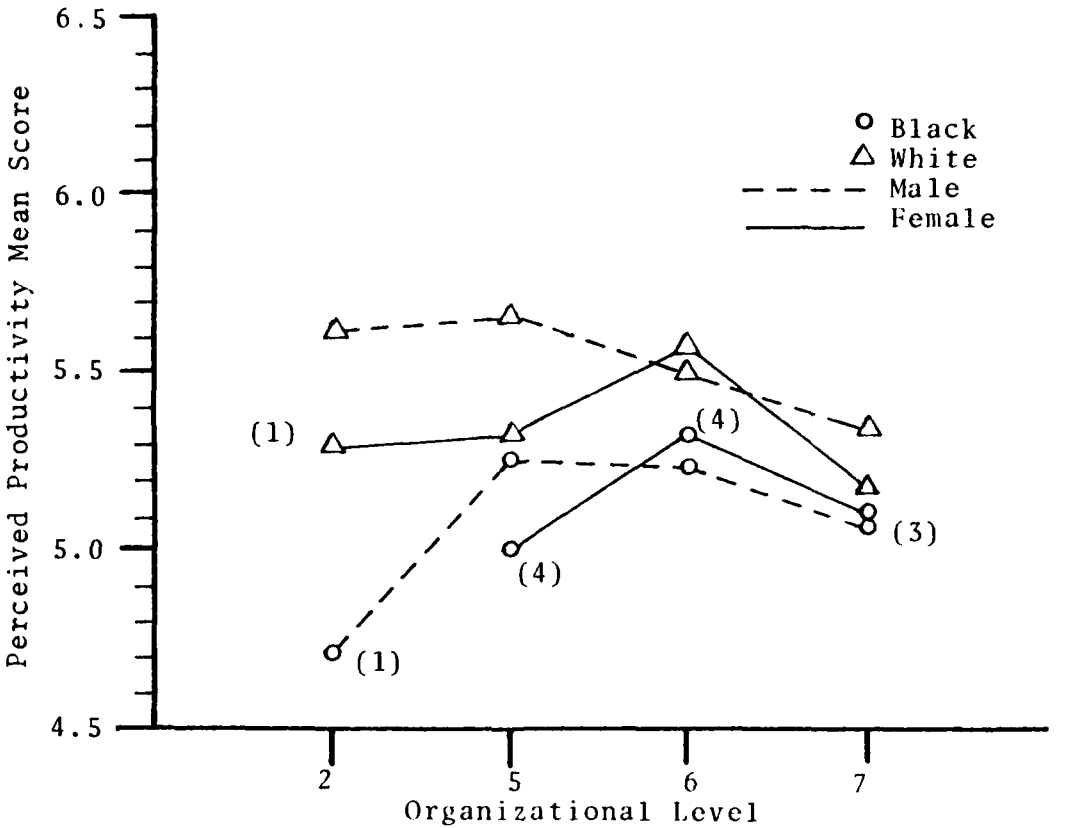
Perceived Productivity By Organizational Level and Sex



Perceived Productivity By Organizational Level and Race



Perceived Productivity By Sex and Race

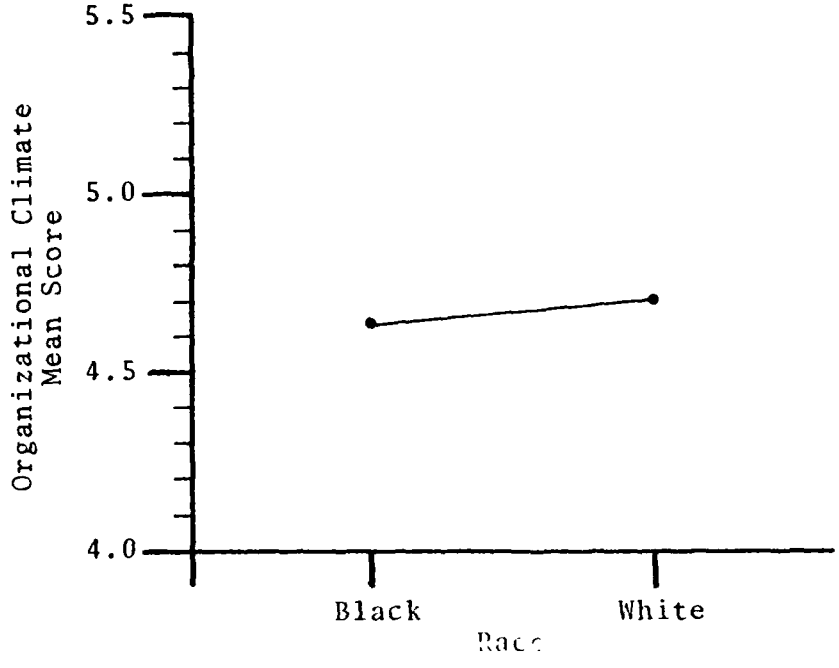


Perceived Productivity By Organizational Level, Sex and Race

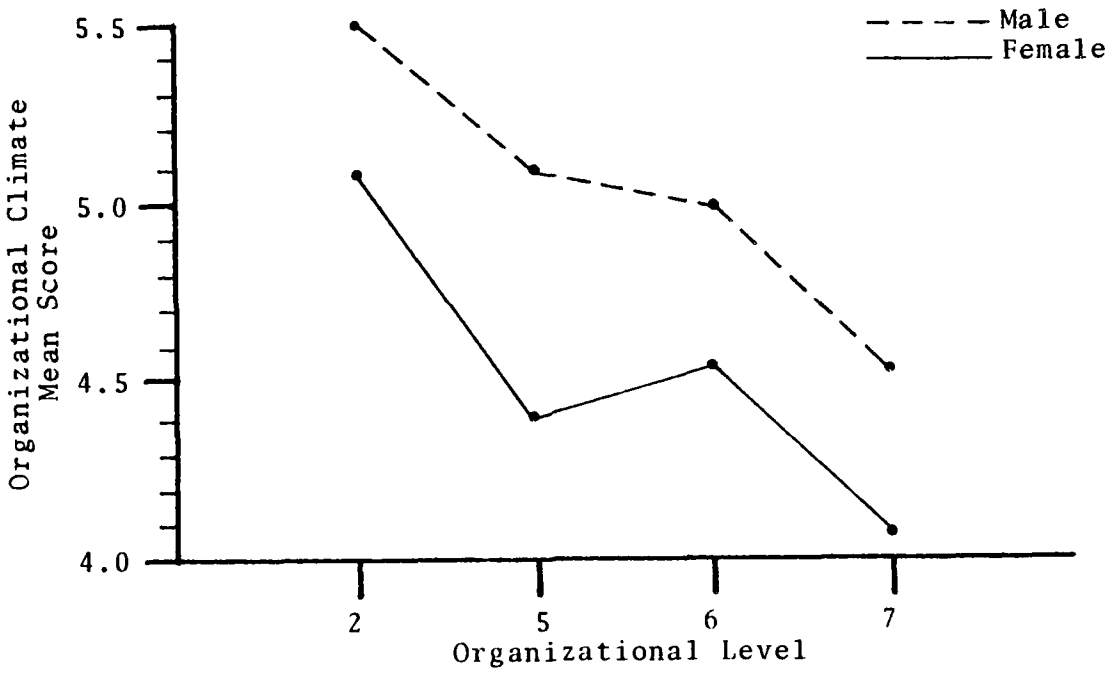
NOTE: At ORGLVL 2 there were no Black female observations

APPENDIX E

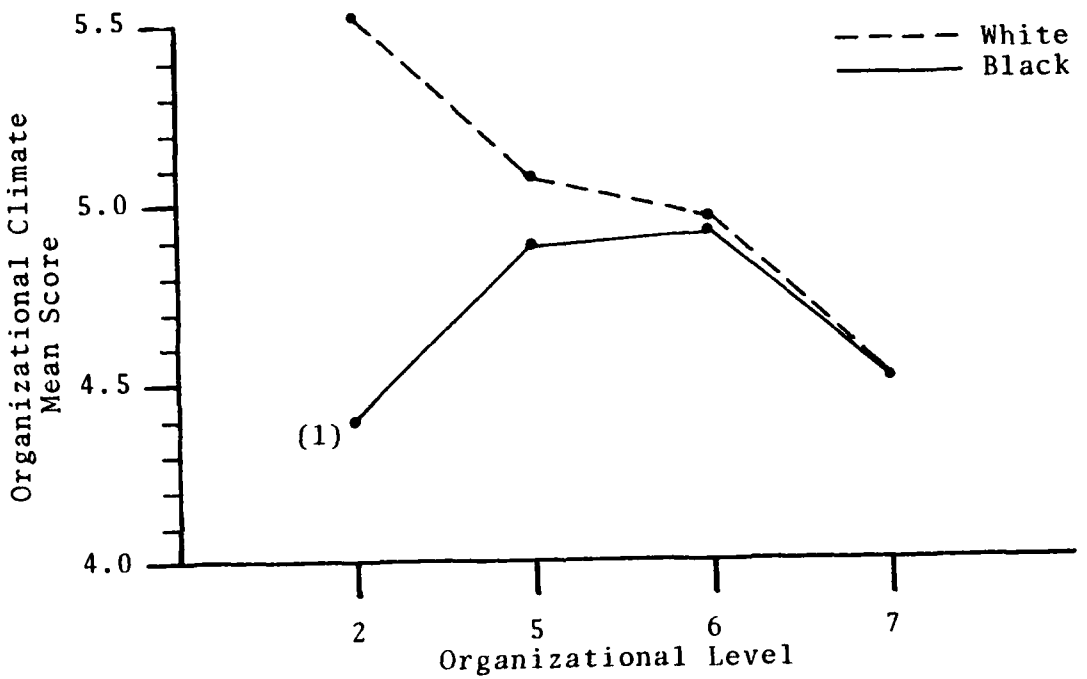
ORGANIZATIONAL CLIMATE--PLOTS OF NONSIGNIFICANT EFFECTS



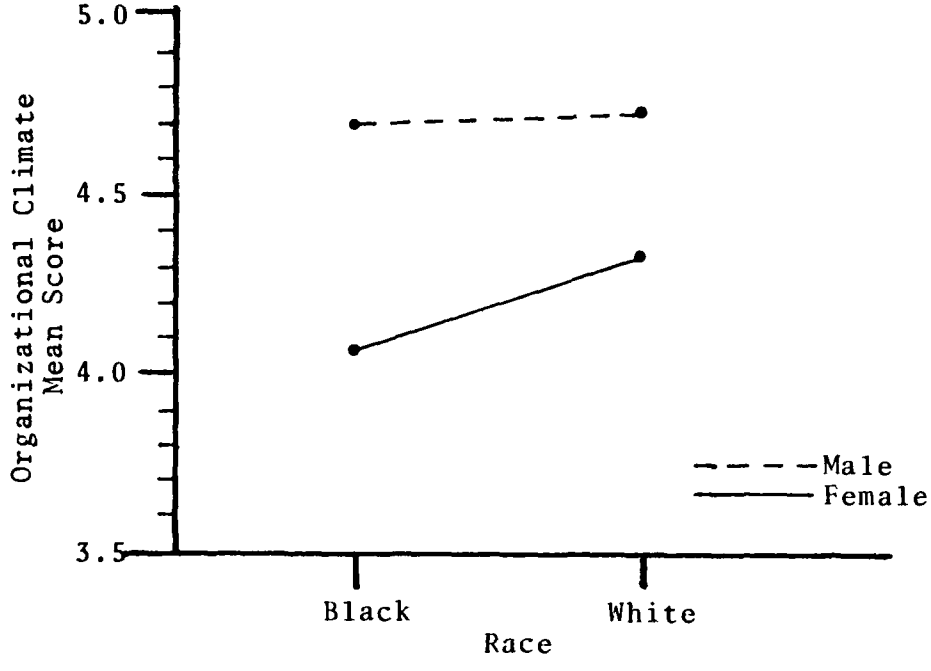
Organizational Climate By Race



Organizational Climate By Organizational Level and Sex



Organizational Climate By Organizational Level and Race



Organizational Climate By Sex and Race

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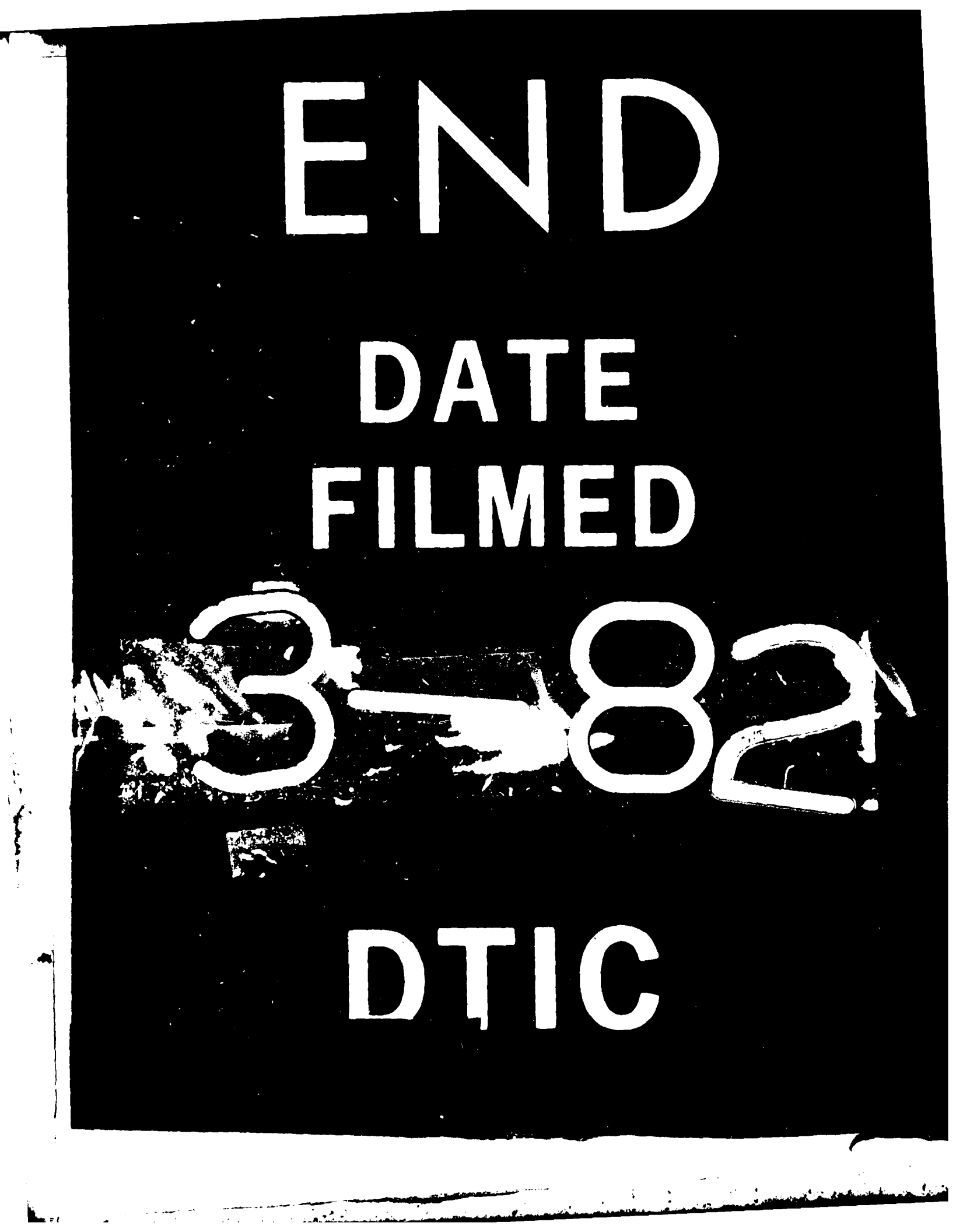
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